

Australian ichneumonids of the tribes Labenini and Poecilocryptini

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Contents

Synopsis	107
Introduction	107
Material examined	108
Checklist of Australian Labenini and Poecilocryptini	108
Subfamily Labeninae	109
Key to tribes of Labeninae	110
Tribe Labenini	110
Key to genera of Labenini occurring in Australia	111
<i>Labena</i> Cresson	111
Key to species of <i>Labena</i> occurring in Australia	112
<i>Certonotus</i> Kriechbaumer	117
Key to species of <i>Certonotus</i> occurring in Australia	119
Tribe Poecilocryptini	137
Key to genera of Poecilocryptini	138
<i>Alaothrys</i> Gauld	138
<i>Poecilocryptus</i> Cameron	139
Key to species of <i>Poecilocryptus</i>	139
<i>Urancyla</i> Gauld	141
Acknowledgements	142
References	142
Index to hosts	149
Index to Ichneumonidae	149

Synopsis

The Australian species of the labenine tribes Labenini and Poecilocryptini are revised and keys provided to the five genera and 36 species occurring on the continent. Twenty new species are described, but one is not formally named as its status requires further investigation. The remaining 16 species are redescribed and their diagnostic features emphasized. *Asperellus* Townes is newly placed as a junior synonym of *Certonotus* Kriechbaumer, *Certonotus tasmaniensis* Turner is treated as a junior synonym of *C. nitidulus* Morley and *Poecilocryptus straminea* Morley placed as a junior synonym of *P. nigromaculatus* Cameron. Lectotypes are designated for five species. Details of known hosts are given together with notes about the geographical distribution of each species. A brief introductory section discusses the systematic position of the subfamily and outlines possible relationships between species. A checklist of Australian species, and indexes to hosts and parasitoids complete the work.

Introduction

Amongst the most important of the natural enemies of insect pests are the parasitic Hymenoptera, a very large group of animals whose larvae develop at the expense of other insects (Askew, 1971). Under normal circumstances, the populations of many injurious insects are severely

limited by the attacks of Parasitica, and in several countries, including Australia, the ravages of accidentally imported pests have been curtailed by the introduction of one or more hymenopterans (Muldrew, 1967; Taylor, 1978). Other introduced pests have been severely attacked by native Australian parasitoids (Tryon, 1900). During the past 30 years there has been an upsurge in interest in using Hymenoptera and other organisms for purposes of pest control (Wilson, 1960; Huffaker & Messenger, 1976) as an alternative to costly, ineffective and environmentally destructive chemical methods (Bosch, 1978). However, for biological control programmes to be successful an intimate knowledge is necessary of the life history and interactions of the pest and its parasites. A sound taxonomic basis is vital for the development of such knowledge (Hardy, 1982), for such work permits the accurate identification of an organism and hence provides constancy and universality in the usage of names, a prerequisite for the national and international communication of information.

The present work is a taxonomic study of two very distinct tribes of one of the apparently most primitive extant ichneumonid subfamilies, the Labeninae. These two tribes, the Labenini and Poecilocryptini, are virtually confined to the southern hemisphere with most species occurring in Australia and South America. The generic phylogeny of the Labeninae and their geographical distribution has recently been studied (Gauld, 1983) but no keys are currently available to facilitate identification of the species. This paper is an attempt to provide a means of determining the Australian species of this interesting group.

The terminology in this work follows that of Gauld (1984).

Material examined

The study is based on examination of almost all specimens available in collections of Australian ichneumonids. Special attention was paid to collections in agricultural institutions that contain a large number of reared specimens. Examination of these collections has been supplemented by extensive collecting, particularly in Tasmania and the south-east. Although the resulting sample is thought to be fairly representative of the fauna of the more humid eastern part of the continent, relatively little material has been examined from the west.

The following abbreviations have been used for museums containing Australian material.

AM	Australian Museum, Sydney, New South Wales, Australia
ANIC	Australian National Insect Collection, Canberra, Australian Capital Territory, Australia
BMNH	British Museum (Natural History), London, U.K.
BIBM	Bernice P. Bishop Museum, Honolulu, Hawaii, U.S.A.
MNHN	Muséum National d'Histoire Naturelle, Paris, France
MNHU	Museum für Naturkunde der Humboldt-Universität, Berlin, D.D.R.
NMV	National Museum of Victoria, Melbourne, Victoria, Australia
NSWDA	New South Wales Department of Agriculture, Rydalmere, New South Wales, Australia
QM	Queensland Museum, Brisbane, Queensland, Australia
TC	Townes Collection, Ann Arbor, Michigan, U.S.A.
WADA	Western Australian Department of Agriculture, Perth, Western Australia, Australia

Checklist of Australian Labenini and Poecilocryptini

LABENINI

CERTONOTUS Kriechbaumer

Asperellus Townes syn. n.

andrewi sp. n.

annulatus Morley

apicalis Morley

avitus sp. n.

celeus sp. n.

cestus sp. n.

farrugiai sp. n.

geniculatus Morley

hinnuleus Krieger comb. rev.

humeralifer Krieger

ixion sp. n.

leeuwinensis Turner comb. rev.

mogimbensis Cheesman comb. rev.

monticola Morley

nitidulus Morley

tasmaniensis Turner syn. n.

paluma sp. n.

pineus sp. n.

rufescens Morley

sisyphus sp. n.

talus sp. n.

toolangi sp. n.*zebrus* sp. n.

species A

LABENA Cresson*annulata* (Brullé)*chadwickii* (Parrott)*grandis* sp. n.*jacunda* sp. n.*keira* sp. n.*malecasta* sp. n.*pudenda* sp. n.**POECILOCRYPTINI****ALAOETHYRIS** Gauld*elongissimus* Gauld**POECILOCRYPTUS** Cameron*coloratus* sp. n.*galliphagus* sp. n.*nigripectus* Turner & Waterston*nigromaculatus* Cameron*straminea* Morley syn. n.**URANCYLA** Gauld*fulva* Gauld**Nomen dubium***Certonotus varius* Kriechbaumer

From Kriechbaumer's original description (1889: 308) it is apparent that this species is one of the larger Australian *Certonotus*. As we have seen no species that agrees with the description, nor can the type be located, we have no option but to treat this as an unrecognized taxon.

Subfamily LABENINAE

The Labeninae is a moderately large subfamily. Amongst the ichneumonid subfamilies it is unique in being a Gondwanic group. Most genera and species are confined to Australasia and/or South America; only a dozen or so taxa occur outside this area (Table 1). All other ichneumonid subfamilies are well represented, if not actually most diverse, in the Holarctic region. Phylogenetic analysis suggests that the Labeninae radiated in West Gondwanaland, prior to the separation of Australia, Antarctica and South America, some 55 mya (Gauld, 1983). The group is only represented by some highly derived species in India and South Africa, suggesting that the Gondwanic radiation occurred after the separation of these continents (c. 100 mya). Many labenines are associated with the southern temperate rain forests, the areas floristically dominated by *Nothofagus*, *Araucaria* and *Podocarpus*. One labenine genus is known to oviposit into the seeds of an *Araucaria* in Australia.

Structurally labenines exhibit many of the plesiomorphic features of ichneumonids, and the larvae are particularly primitive (Short, 1978). Biologically they also show many of the so-called primitive features of ichneumonids – they are ectoparasitoids and many are known to parasitize wood-boring insects.

It is not clear what the sister-group to the labenines is. The more primitive taxa (Labenini) closely resemble some Pimplinae, but all the similarities can, we believe, be interpreted as either symplesiomorphies, or parallel adaptations to the wood-boring habit. We suggest that the shared specializations shown by labenines and rhyssines are parallelisms rather than synapomorphies because of the striking differences in oviposition behaviour between the groups. Labenines manipulate the ovipositor with a specialized guide on the antero-medial surface of the hind coxa; rhyssines achieve similar control with specialized claspers on the ventral surface of the gaster. It is not impossible that these taxa share a close common ancestor (a wood-borer with no specialization to control the ovipositor), but there is no conclusive phylogenetic evidence to support such speculation. We suggest that the labenines are a primitive offshoot of the earliest ichneumonid radiation, and that at an early stage in their evolutionary history they became isolated on a southern continent prior to undergoing a modest radiation, that has in some respects paralleled that of other ectoparasitic ichneumonids (see Gauld, 1983; 1984).

The Labeninae comprises four morphologically distinctive tribes, Labenini, Groteini, Poecilocryptini and Brachycyrtini, all of which are well represented in Australia (Table 1). Both the Groteini and Brachycyrtini include some genera for which relatively insufficient material is at hand to justify undertaking a taxonomic revision at present. Quite good series of some species of Labenini and Poecilocryptini are available for systematic study, and as there are far more species than the few described the opportunity has been taken to monograph these taxa.

Table 1 The distribution of the Labeninae.

	New Zealand	Moluccas	New Guinea	Australia	South America	North America	Eurasia	Other regions
<i>Xenothyris</i>	—	—	—	—	2	—	—	—
<i>Labena</i>	—	—	—	7	50	2	—	—
<i>Certonotus</i>	1	2	9	23	5	—	—	—
<i>Apechoneura</i>	—	—	—	—	25	—	—	—
<i>Labium</i>	—	—	1	50	1	—	—	—
<i>Grotea</i>	—	—	—	—	20	3	—	—
<i>Macrogrotea</i>	—	—	—	—	10	—	—	—
<i>Alaothyris</i>	—	—	—	1	—	—	—	—
<i>Urancyla</i>	—	—	—	1	—	—	—	—
<i>Poecilocryptus</i>	—	—	—	4	—	—	—	—
<i>Pedunculus</i>	—	—	—	—	5	—	—	—
<i>Adelphion</i>	—	—	2	6	—	—	—	—
<i>Monganella</i>	—	—	—	1	?1	—	—	—
<i>Habryllia</i>	—	—	—	—	4	—	—	—
<i>Brachycyrtus</i>	—	—	1	3	5	2	2	2

Key to tribes of Labeninae

- 1 Mandible long and slender, labrum very large, almost as long as clypeus (Fig. 1); female with ovipositor barely projecting beyond apex of gaster, dorsoventrally depressed **GROTEINI**
- Mandible rather short and not particularly slender, labrum from moderately small to virtually concealed (Fig. 2); female with ovipositor projecting beyond apex of gaster by at least 0.5 times length of hind tibia 2
- 2 Fore wing with abscissa of Cu_1 , between $1m-cu$ and Cu_{1a} at least 1.4 times as long as Cu_{1b} (Fig. 3); hind coxa of female with a furrow on anterior surface internally; base of valvula 3 bearing distinct sclerotized lobe (Fig. 4) **LABENINI** (p. 110)
- Fore wing with abscissa of Cu_1 between $1m-cu$ and Cu_{1a} from subequal to, to conspicuously shorter than Cu_{1b} (Figs 5, 6); hind coxa of female without a furrow on anterior surface internally; base of valvula 3 without a distinct sclerotized lobe 3
- 3 Fore wing with $2m-cu$ with one long bulla, sometimes with an indistinct trace of a vein centrally (Fig. 5); occipital carina dorsally absent **POECILOCRYPTINI** (p. 137)
- Fore wing with $2m-cu$ with two short bullae widely separated from each other (Fig. 6); occipital carina dorsally complete **BRACHYCYRTINI**

The Groteini and Brachycyrtini are not discussed further in this paper.

Tribe LABENINI

Labenines are characterized by having a distinct sclerotized lobe at the base of the third valvula. Most species also have fine file-like teeth at the distal apex of the ovipositor. The tribe contains four genera: *Labena*, *Certonotus*, *Apechoneura* and *Xenothyris*. The last two are exclusively Neotropical, and *Apechoneura* may well be a specialized species-group of *Certonotus*. *Labena* and *Certonotus* are most commonly found in Australia and South America, and there is evidence to suggest that the group is an ancient southern one that originated in the cool temperate forests of Gondwanaland (Gauld, 1983). As far as is known, the native hosts of the group are

coleopterous larvae boring in wood (Townes, 1969; Gauld, 1984), though one species has adapted to parasitizing introduced siricids (Hocking, 1967).

Structurally, labenines are amongst the most primitive ichneumonids. Virtually all species have clearly developed parapsidal furrows, a primitive hymenopterous feature found widely amongst Symphyta and some lower Aculeates. An apparently unique feature of the group is the presence of a distinct sclerotized lobe at the base of the third valvula (Fig. 4). In other ichneumonids a slightly broadened, rounded area is present in a homologous position and this may well represent a precursor of the valvular lobe. Quite what this structure is, at present is unclear, as recent morphological treatises make no mention of such a structure (e.g. Smith, 1970; Matsuda, 1976). Short (1978) comments on the primitive structure of labenine larvae.

Key to genera of Labenini occurring in Australia

- 1 Mesoscutum punctate or puncto-striate; occipital carina mediodorsally complete or only narrowly interrupted; apex of fore tibia with a conspicuous long curved spine on outer distal margin; female with third fore tarsal segment produced apically into a lobe that reaches beyond apex of fourth segment (Fig. 7) **LABENA** Cresson (p. 111)
- Mesoscutum with transverse rugae; occipital carina dorsally entirely absent; apex of fore tibia with a short tooth on outer distal margin; female with fore tarsus simple
CERTONOTUS Kriechbaumer (p. 117)

LABENA Cresson

Labena Cresson, 1864: 399. Type-species: *Cryptus grallator* Say, by subsequent designation, Viereck, 1914: 80.

Caryoecus Walsh, 1866: 30. Type-species: *Mesochorus fuscipennis* Brullé (= *Cryptus grallator* Say), by monotypy.

Microtritus Kriechbaumer, 1889: 307. Type-species: *Microtritus apicalis* Kriechbaumer, by monotypy.

Dyseidopus Kriechbaumer, 1890: 489. Type-species: *Dyseidopus sericeus* Kriechbaumer, by monotypy.

Dysidopus Schulz, 1906: 103. [Unjustified emendation.]

Neonotus Parrott, 1955: 230. Type-species: *Neonotus chadwickii* Parrott, by original designation.

Moderately large to large insects, fore wing length 6–20 mm; clypeus small, flat or concave, very thin with margin arcuate; labrum barely projecting; mandible tapered, twisted 30° with upper tooth slightly the longer; outer mandibular surface with a median longitudinal groove bearing hairs; malar space shorter than basal mandibular width. Occipital carina complete or narrowly interrupted centrally; eye margin slightly indented opposite antennal socket. Antenna almost cylindrical, that of female with a small flat sensillum on extreme distal apex. Mesoscutum punctate or striate transversely, with notauli vestigial; notaular crests well developed. Propodeum rather short, convexly rounded with spiracle elliptical; propodeal area usually defined, area superomedia usually larger than area petiolaris; gaster inserted high on propodeum, above level of hind coxae. Fore tibia of female inflated (so it often collapses in dried specimens) with a large curved spine on outer distal margin; fore tarsus with segment 3 lobed, the lobe reaching nearly to centre of segment 5, segment 4 reduced; hind coxa of female flattened internally with a short basal groove; tarsal claws large, simple. Fore wing with *cu-a* more or less opposite base of *Rs&M*; *3r-m* present, areolet large, rhombic or with very short anterior side; *2m-cu* sinuous with two bullae. Hind wing with distal abscissa of *Cu*₁ present, sometimes not joining to first abscissa of *Cu*₁, if joined, then first abscissa of *Cu*₁ is shorter than *cu-a*; basal cell slender; *Sc* with one or two hamuli. Gaster quite long, cylindrical; tergite 1 with spiracles a little before centre; sternite 1 usually reaching to or slightly beyond level of spiracles; laterotergites 2–4 membranous; last visible tergite with a small, weakly defined dorsal plate differentiated. Ovipositor projecting beyond apex of gaster by 1.8–4.4 times length of hind tibia; upper valve with apex bearing blunt serrations, lower valve apically almost enclosing the upper, usually with series of close file-like teeth and a fine coriaceous patch just proximal to these teeth, rarely with teeth quite strongly developed.

REMARKS. *Labena* is a large genus with most species occurring in the Neotropics. Two species occur in North America, and in this work seven are recognized from Australia.

Labena species are easily separated from other Labenini by the specialized fore tarsus and the possession of a sensillum on the extreme apex of the antenna. It resembles the Neotropical genus *Xenothyris* Townes in having a relatively smooth mesoscutum, though in the latter taxon rugae are present on the anterior part of the median lobe. Unlike *Xenothyris*, *Labena* species have simple claws.

The relationships of the Australian species. As the vast majority of the Neotropical species are undescribed and virtually unstudied it is impossible as yet to state whether the Australian *Labena* constitute a holophyletic group, so no formal cladistic analysis is presented here. However, the seven Australian species are clearly divisible into two monophyletic species-groups, each of which is characterized by several apomorphic features. The *annulata*-group contains four taxa (*L. annulata*, *grandis*, *chadwickii* and *malecasta*). All these species have Cu_1 in the hind wing incomplete and have the white flagellar band at the distal apex of the antenna. The *keira*-group contains three taxa (*L. keira*, *jacunda* and *pudenda*). These species have virtually a smooth mesopleuron, and the male genitalia are specialized in that the apex of the gonosquama is flattened or impressed and surrounded by a fringe of very long hairs (Figs 9, 10).

The interrelationship of the taxa within these species-groups is less clear. Within the *keira*-group, *keira* and *pudenda* share two apparently apomorphic features, a specialized mid tibia and a medially interrupted yellow band on the central female gastral segments. The unspecialized mid tibia found in *L. jacunda* may represent a reversal to the plesiomorphic condition unless the apomorphic state has been derived independently in both the *keira* and *annulata* lineages (and probably also in various Neotropical groups). It is therefore arguable that the possible sister-relationship between *keira* and *pudenda* is only supported by the colour character. Contradicting this relationship are two features shared by *pudenda* and *jacunda*—the coarse ovipositor teeth (Fig. 21) and the large impressed area on the apex of the male gonosquama. The latter is quite clearly an apomorphic condition but the polarity of the former is controversial as the possession of coarse teeth is probably plesiomorphic for ichneumonids. Other Labenini all have fine, file-like ovipositor teeth and it is considered that this condition is an apomorphy of the tribe (Gauld, 1983) and consequently plesiomorphic for *Labena* species. Thus the possession of coarse teeth can be regarded as a further apomorphic development, albeit a reversal, supporting the group *pudenda* and *jacunda*.

Within the *annulata*-group the three species *grandis*, *chadwickii* and *malecasta* seem to form a subgroup characterized by possession of transverse striations on the mesoscutum. This subgroup apparently has a sister-relationship to *L. annulata* (Fig. 65).

Key to species of *Labena* occurring in Australia

- 1 Hind wing with distal abscissa of Cu_1 present in membrane, not confluent with Cu_1 and $cu-a$ (Fig. 11); mesopleuron quite closely punctate or punctocoriaceous, often submatt; male gonosquama not distally strongly flattened, with a fringe of fine hairs (Fig. 8) or a single tuft of long hairs (*annulata*-group) 2
- Hind wing with distal abscissa of Cu_1 complete (Fig. 12); mesopleuron smooth and polished, at most with sparse punctures; male gonosquama distally flattened or impressed, with this area fringed with long hairs (Figs 9, 10) (*keira*-group) 5
- 2 Tergites 2–4 of gaster coarsely and very closely punctate, matt (Fig. 13); ovipositor 2.0 or less times as long as hind tibia *annulata* (Brullé) (p. 113)
- Tergites 2–4 of gaster smooth and polished, at most with very fine punctures (Fig. 14); ovipositor at least 2.5 times as long as hind tibia 3
- 3 Posterior end of gaster with mediodorsal margin thickened and produced into a rounded prominence (Fig. 15); pronotum with a median lateral conical tubercle; metapleuron strongly vermiculate *grandis* sp. n. (p. 114)
- Posterior end of gaster with mediodorsal margin thin, slightly concave, not produced (Fig. 16); pronotum, at most, with a median lateral convex swelling, usually virtually flat; metapleuron punctate or puncto-striate 4
- 4 Female with ovipositor at least 3.5 times as long as hind tibia; occipital carina mediodorsally complete; male with a tuft of long hairs on distal apex of gonosquama *malecasta* sp. n. (p. 116)
- Female with ovipositor at most 3.0 times as long as hind tibia; occipital carina (of female at least) mediodorsally, narrowly interrupted; male with gonosquama distally evenly rounded and uniformly hirsute *chadwickii* (Parrott) (p. 113)
- 5 Mid tibia slender, subcylindrical (Fig. 17); tergites 4–5 of gaster with broad posterior yellow marginal band; hind coxa of female with ovipositor guide barely differentiated *jacunda* sp. n. (p. 115)
- Mid tibia distally swollen, proximally narrowed and at least slightly flattened (Fig. 18); tergites 4–5 of gaster with posterior marginal yellow band centrally interrupted or yellow band indistinct; hind coxa of female with ovipositor guide well developed 6
- 6 Apex of fore wing infumate; mid tibia with a longitudinal row of 3–6 spine-like bristles on outer surface (Fig. 18); submetapleural carina evenly and weakly broadened anteriorly (Fig. 19); ovipositor about 3.0 times as long as hind tibia *keira* sp. n. (p. 115)

- Apex of fore wing very uniformly hyaline; mid tibia without obvious spine-like bristles on outer surface; submetapleural carina anteriorly abruptly expanded into a rounded lobe (Fig. 20); ovipositor about 4.0 times as long as hind tibia..... *pudenda* sp. n. (p. 117)

***Labena annulata* (Brullé)**

(Figs 8, 11, 13)

Ephialtes annulatus Brullé, 1846: 86. Holotype ♀, TASMANIA (MNHN) [examined].

Labena annulata (Brullé) Townes *et al.*, 1961: 112.

Female. Moderately large species, fore wing length 7–13 mm. Malar space 0.4 times as long as basal mandibular width. Occipital carina mediodorsally narrowly interrupted, ventrally joining hypostomal carina and continuing to mandibular base as a distinct carina, not developed into a flange. Pronotum laterally almost flat; mesothorax laterally and ventrally bearing dense, short, white pubescence; mesoscutum closely and coarsely punctate; horizontal mesopleural furrow indistinct; metapleuron closely and coarsely punctate; submetapleural carina anteriorly expanded into a rounded lobe. Propodeum with anterior transverse carina present centrally separating area superomedia from area basalis. Fore wing with *3r-m* and *2r-m* converging, widely separated at junction with *Rs*. Hind wing with distal abscissa of *Cu*₁ present in membrane, not confluent with *Cu*₁ and *cu-a*. Mid tibia with a longitudinal row of spine-like bristles on outer surface, proximally slender, distally swollen with a trace of groove in inner surface. Gaster with sternite 1 0.7 times as long as the hind coxa, reaching to level of spiracle; tergites 2–4 coarsely and very closely punctate, matt; apex of terminal plate of tergite 8 simple. Ovipositor projecting beyond apex of gaster by 1.8–2.0 times length of hind tibia, the apex bearing very fine teeth.

Coloration. As for *L. pudenda* although some specimens with fore and mid legs entirely yellow.

Male. Similar to female but with fore wing length 7–8 mm; malar space 0.4 times basal mandibular width; gaster with sternite 1 0.7–0.8 times as long as hind coxa. Gonosquama with an apical tuft of fine, long hairs.

REMARKS. *L. annulata* is one of the most distinctive species of Australian *Labena* and can easily be recognized by its very close, coarse punctured microsculpture, particularly on the tergites of the gaster. The ovipositor is shorter than that of any other species. This species is widespread in Australia though it seems to be most common in the south and west.

HOST RECORDS. Cerambycidae: *Uracanthus strigosus* Pascoe (NMV).

MATERIAL EXAMINED

Holotype ♀, **Tasmania**: no further data (MNHN).

Queensland: 1 ♀, 14 km W. by N. Hope Vale Mission (15.16S 144.59E), x.1980 (*Cardale*) (ANIC). **New South Wales:** 1 ♀, 2 ♂, Kinchega NP, ix.1980 (*Rodd*) (AM). **Victoria:** 1 ♀, Baxter, parasite on *Uracanthus strigosus* (*Dixon*) (NMV); 1 ♀, Healesville, xi.1983 (NMV). **Northern Territory:** 2 ♀, Areyonga, 600 m, viii (TC). **Tasmania:** 2 ♀, Hobart, ix.1921 (*Cole*) (NMV); 1 ♂, Ridgeway ix.1943 (*Cole*) (NMV); 1 ♀, 1867 (*Sichel*) (TC) (compared with type). **Western Australia:** 1 ♀, 13 km WNW. Northampton (28.18S 114.31E), x.1981 (*Naumann & Cardale*) (ANIC); 1 ♀, no further data (BMNH).

***Labena chadwickii* (Parrott)**

(Fig. 14)

Neonotus chadwickii Parrott, 1955: 230. Holotype ♀, NEW SOUTH WALES (NSWDA) [examined].

Labena chadwickii (Parrott) Townes & Townes, 1960: 531.

Female. Moderate to large species, fore wing length 6–17 mm. Malar space 0.5 times as long as basal mandibular width. Occipital carina mediodorsally narrowly interrupted at least in female, ventrally joining hypostomal carina and continuing to base of mandibular base as distinct carina, not developed into a flange. Pronotum laterally with a median swelling; mesothorax laterally and ventrally bearing sparse, short, white pubescence; mesoscutum punctate, at least transversely striate in centre, in larger specimens uniformly striate; horizontal mesopleural furrow distinct; metapleuron punctate; metapleural carina expanded anteriorly into a small rounded lobe. Propodeum with anterior transverse carina present centrally, separating area superomedia from area basalis. Fore wing with *3r-m* and *2r-m* converging, almost joining at junction with *Rs*. Hind wing with distal abscissa of *Cu*₁ present in membrane, not confluent with *Cu*₁ and *cu-a*. Mid tibia with a longitudinal row of spine-like bristles on outer surface, proximally slender, distally swollen and with indication of groove on inner surface. Gaster with sternite 1 0.8 times as long as hind coxa, reaching from opposite to well behind level of spiracle; tergites 2–4 smooth

and polished, at most with very fine punctures; apex of terminal plate of tergite 8 simple. Ovipositor projecting beyond apex of gaster by 2·2–3·0 times length of hind tibia, the apex bearing very fine teeth.

Coloration. Black. Palps, labrum, clypeus, face (except median longitudinal area), genae, orbits, anterolateral margin of mesonotum, tegula, posterior 0·3 of subalar process, posterior 0·5 of scutellum, postscutellum, posterior 0·3 of propodeum, posterior margins of tergites 1–7, distal end of each coxa, fore and mid legs with trochanters, distal 0·2 of femur, tibia and tarsus, hind legs with distal 0·1 of femur and tibial spurs yellow. Median area of frons, mesonotum, mesopleuron, metapleuron, upper surface of hind coxa partly deep red. Antenna with disruptive mark subapical, last 2–3 flagellar segments black.

Male. Similar to female but with fore wing length 6–9 mm; malar space 0·6 times basal mandibular width; gaster with sternite 1 0·8 times as long as hind coxa. Gonosquama distally evenly rounded and uniformly hirsute. Coloration as for female with less deep red areas.

REMARKS. *L. chadwickii* is the commonest and most widespread eastern species in Australia. Of the species with an apical white flagellar band, complete yellow posterior margined gastral tergites and incomplete *Cu*₁ in the hind wing only *chadwickii* has a simple terminal plate, smooth gastral tergites and incomplete occipital carina. The females are rather similar to *L. malecasta* but differ in having a shorter ovipositor and the genal orbits more broadly yellow and confluent with the yellow on the face. *L. malecasta* has only narrow yellow marks on the genae and these are not confluent with the facial yellow.

HIST RECORDS. Buprestidae: *Ethon affine* Laporte & Gory (Parrott, 1955). Several individuals have been reared in Tasmania from logs of *Pinus radiata* infested by *Sirex*.

MATERIAL EXAMINED

Holotype ♀, New South Wales: Middlecove Point, Willoughby, Sydney (*Chadwick*) (NSWDA).

Queensland: 1 ♀, Eungella, xi (TC); 1 ♀, 6 m N. of Kuranda, 11.i.1967 (*McAlpine & Holloway*) (AM); 1 ♀, Mt Cootha, iv (TC); 1 ♀, Mt Glorious, vi.1977 (*Hiller*) (BMNH); 1 ♀, Mt Glorious, xii.1976 (*Bouček*) (BMNH); 2 ♀, Mt Glorious, i (TC); 2 ♀, Mt Nebo, ii (TC); 1 ♀, Mt Tambourine, iii.1950 (*Burns*) (NMV); 4 ♀, Mt Tambourine, xii (TC); 1 ♀, O'Reilly's Guest House, iii.1980 (BMNH); 1 ♂, Palm Is., near Townsville, x (TC); 1 ♂, Stanthorpe, 1982 (*Sedlacek*) (TC). New South Wales: 1 ♀, Eucambene Dam, i.1961 (*Leipa*) (ANIC); 3 ♂ (paratypes), same data as holotype (AM, ANIC, NSWDA); 1 ♀, Monga, ix.1957 (ANIC); 6 ♂, Mt Tomah, ix.1982 (*Rodd*) (AM); 1 ♀, Mt Tomah, xi.1978 (*Rodd*) (AM); 1 ♀, Wentworth Falls, Blue Mtns, xi.1982 (*McAlpine*) (AM). Australian Capital Territory: 1 ♀, Lees Ck, xi.1977 (*Daniels*) (AM). Victoria: 1 ♀, 6 km S. Aberfeldy, xi.1976 (*Calder*) (NMV); 1 ♀, Blackwood Ra., x.1953 (*Neboiss*) (NMV); 2 ♀, Ferntree Gully, x.1951 (*Oke*) (NMV); 1 ♀, Gippsland (AM); 1 ♂, Kinglake W., x.1954 (*Neboiss*) (NMV); 1 ♀, Lal Lal, i.1954 (*Neboiss*) (NMV); 1 ♀, 1 ♂, 12 km SE. Merrijig, Howqua R., xi.1971 (*Neboiss*) (NMV); 1 ♀, Mitta Mitta R., x.1973 (NMV); 1 ♀, 1 ♂, Mt Dandenong, 200 m, ii (TC); 1 ♂, Mt Drummer, xii.1956 (*Riek*) (ANIC); 1 ♀, Warburton, xii.1972 (*Sedlacek*) (TC); 1 ♀, Woori Yallock, x.1932 (*Burns*) (NMV). Tasmania: 1 ♂, Bronte Park, i (TC); 1 ♀, Cambridge, i.1965, ex *Pinus radiata* log (*Taylor*) (ANIC); 1 ♀, Cambridge, xii.1964, ex *Pinus radiata* logs (*Taylor*) (BMNH); 1 ♀, 2 ♂, Hobart, xi.1922 (*Cole*) (NMV); 1 ♀, Hobart, xii.1915 (*Cole*) (NMV); 2 ♂, Launceston, x.1927 (*Cole*) (NMV); 1 ♀, Leven R., xi.1975 (*Neboiss*); 1 ♀, Ridgeway, ix.1942 (*Cole*) (NMV); 2 ♀, Roseberry, i (TC); 1 ♀, Strahan, iii (TC).

Labena grandis sp. n.

(Fig. 15)

Female. Large species, fore wing length 17 mm. Malar space 0·6 times as long as basal mandibular width. Occipital carina mediadorsally complete, ventrally joining hypostomal carina and continuing to mandibular base as distinct carina, not forming a flange. Pronotum laterally with a median conical tubercle; mesothorax laterally and ventrally bearing sparse, short, white pubescence; mesoscutum strongly, transversely striate; horizontal mesopleural furrow distinct, at least posteriorly; metapleuron vermiculate; submetapleuron carina strongly broadened into a triangular striate lobe. Propodeum with anterior transverse carina present centrally, separating area superomedia and area basalis. Fore wing with 2*r-m* converging towards 3*r-m*, almost joining it at junction with *Rs*. Hind wing with distal abscissa of *Cu*₁ present on membrane, not confluent with *Cu*₁ and *cu-a*. Mid tibia with longitudinal row of spine-like bristles on outer surface, the distal end swollen somewhat, proximally slender and with a diagonal internal furrow present. Gaster with sternite 1 0·5 times as long as hind coxa, reaching to level of spiracle; tergites 2–4 smooth and polished; apex of terminal plate of tergite 8 specialized. Ovipositor projecting beyond apex of gaster by 2·8 times length of hind tibia, the apex bearing very fine teeth.

Coloration. Black. Palps, labrum, clypeus, inner orbits, outer orbits, antero-lateral margin of mesoscu-

tum, tegula, posterior 0.5 of subalar process, posterior 0.4 of propodeum, posterior margin of tergites 1-7, fore and mid legs (except inner surface of femur and tibia), hind leg with distal tip of coxa, trochanter, femur, proximal end of tibia and tarsus yellow.

Male. Unknown.

REMARKS. Only a single specimen of this species is known. It is immediately distinguished by possession of a uniquely specialized tergite 8, having the metapleuron strongly vermiculate and having a swollen pronotum. The hind coxae are shorter and stouter than those of other species and the petiole is considerably more robust.

MATERIAL EXAMINED

Holotype ♀, **Western Australia:** Yallingup, Cape Naturaliste, ix-x.1913 (*Turner*) (BMNH).

Labena jacunda sp. n.

(Fig. 17)

Female. Large species, fore wing length 13-14 mm. Malar space 0.6 times as long as basal mandibular width. Occipital carina mediodorsally complete, ventrally joining hypostomal carina far from base of mandible. Pronotum laterally weakly convex; mesothorax laterally and ventrally bearing sparse pubescence; mesoscutum with superficial punctures; horizontal mesopleural furrow indistinct; metapleuron finely sparsely punctate; submetapleural carina broadened anteriorly into ribbed lobe. Propodeum with anterior transverse carina complete so area superomedia is distinctly delineated. Fore wing with *3r-m* slightly inclined, *2r-m* strongly convergent anteriorly. Hind wing with distal abscissa of *Cu*₁ complete. Mid tibia slender, cylindrical, with scattered spines on outer surface. Gaster with sternite 1 0.6-0.7 times as long as hind coxa, reaching to level of spiracle, the membranous portion unusual in being a pair of well-developed crests; tergites 2-4 smooth and polished; apex of terminal plate of tergite 8 simple. Ovipositor projecting beyond apex of gaster by about 3.5 times length of hind tibia, apex bearing 8 distinct strong teeth.

Coloration. Black. Face, frontal and genal orbits narrowly, tegula, small mark on subalar prominence, scutellum, posterior part of propodeum and posterior margins of all tergites yellow; mesopleuron and base of petiole reddish; anterior two pairs of legs predominantly yellow; hind legs black, distal apex of coxa and femur and proximal end of tibia and basitarsus yellow.

Male. Similar to female but with fore wing length 13-14 mm; malar space 0.3 times basal mandibular width; gaster with sternite 1 1.0 times as long as hind coxa. Gonosquama distally flattened, impressed, the impressed area surrounded by a fringe of long hairs. Black with face, frontal and genal orbit, tegula, subalar prominence, scutellum, postscutellum, hind margin of propodeum, broad posterior bands on gastral tergites, anterior 2 pairs of legs, hind trochanter and trochantellus, proximal 0.5 of tibia, entire basitarsus and extreme proximal apex of second tarsal segment yellow. Flagellum black, with a subapical whitish mark that is not a complete band.

REMARKS. The female of this species is immediately recognizable by the slender mid tibia and ventral petiolar prominences which are unique features of this species amongst Australian *Labena*. The broad yellow bands on the gaster distinguish the male of *jacunda* from *pudenda* and *keira*, the only other species with ornamented male gonosquamae.

MATERIAL EXAMINED

Holotype ♀, **Victoria:** Chiltern (NMV).

Paratypes. **Victoria:** 2 ♂, Mt Buffalo, 4,500', 13.i.1955 (*Neboiss*) (NMV).

Labena keira sp. n.

(Figs 9, 12, 18, 19)

Female. Large species, fore wing length 11-16 mm. Malar space 0.5 times as long as basal mandibular width. Occipital carina mediodorsally complete, ventrally joining hypostomal carina and forming a flange. Pronotum laterally with a slight median swelling; mesothorax laterally and ventrally bearing no white pubescence; mesoscutum smooth, with sparse fine punctures; horizontal mesopleural furrow distinct and widening posteriorly; metapleuron smooth and polished; submetapleural carina slightly broadened anteriorly, not produced into a lobe. Propodeum with anterior transverse carina present centrally, separating area superomedia from area basalis. Fore wing with *3r-m* and *2r-m* convergent, sometimes almost joining at junction with *Rs*. Hind wing with distal abscissa of *Cu*₁ complete. Mid tibia with a longitudinal row of spine-like bristles on outer surface, proximally slender and slightly flattened, distally

swollen. Gaster with sternite 1 0·7 times as long as hind coxa, just reaching to slightly behind level of spiracle; tergites 2–4 smooth and polished; apex of terminal plate of tergite 8 simple. Ovipositor projecting beyond apex of gaster by 3 times length of hind tibia, the apex bearing very fine teeth.

Coloration. Black to deep red. Palps, labrum, clypeus, face, outer orbits, frons (except ocellar triangle and vertex), scutellum, scutellar ridges, postscutellum, postscutellar ridges, tegulae, subalar process, small mesopleural macula, posterior 0·5 of propodeum, posterior margin of tergites 1–8 (often divided medially), fore and mid legs except sometimes distal 0·5 of mid femur, hind trochanters, basal 0·5 of tibia and basal tarsal segment yellow. Disruptive mark of antenna medially placed, apex of fore wing infumate.

Male. Similar to female but with fore wing length 8–13 mm; malar space 0·4 times basal mandibular width; gaster with sternite 1 0·9 times as long as hind coxa. Gonosquama distally flattened and fringed partially by very fine hairs. Coloration. As for female, sometimes with less yellow on gaster and no white disruptive marks on antenna.

REMARKS. *L. keira* is immediately recognizable by the infumate mark on the distal apex of the fore wing. Structurally it is rather similar to *L. pudenda* from which it may be separated by the submetapleural carina being barely expanded, spinose mid tibia and centrally complete anterior transverse carina of the propodeum. This is one of the most widely distributed species of *Labena* and is recorded from Victoria north to central Queensland. It is also known to occur on Lord Howe Island.

MATERIAL EXAMINED

Holotype ♀, New South Wales: Mt Tomah, 28.iii.1980 (Rodd) (AM).

Paratypes. **Queensland**: 1 ♀, Bunya Mtns, i.1938 (Geary) (AM); 3 ♂, Eungella, ix.1923 (NMV); 2 ♀, Eungella, xi (TC); 1 ♀, 9 ♂, Montville, ix.1955 (Burns) (NMV); 1 ♀, 9 ♂, Mt Glorious, xi & i (TC); 4 ♀, 1 ♂, Mt Tambourine, x.1977 (Galloway) (BMNH); 7 ♀, 8 ♂, Mt Tambourine, xi–xii (TC); 1 ♀, Mt Tip Tree (17-02S 145-37E), x.1980 (Cardale) (ANIC); 1 ♂, Westwood, xi.1924 (Burns) (NMV); 1 ♂, Wilson's Peak, Killarney, 9.i.1977 (Bouček) (BMNH). **New South Wales**: 1 ♂, Lord Howe Is., (AM); 1 ♂, Lord Howe Is., 30.xi.1955 (Paramonov & Leipa) (ANIC); 1 ♂, Lord Howe Is. xii.1977 (Liepa) (ANIC); 1 ♂, Mooney Mooney Creek, near Gosford, xi.1975 (McAlpine & Schneider) (AM). **Australian Capital Territory**: 1 ♀, Mt Gingera, i.1957 (Riek) (ANIC).

Labena malecasta sp. n.

(Fig. 16)

Female. Large species, fore wing length 13–15 mm. Malar space 0·8 times as long as basal mandibular width. Occipital carina mediodorsally complete, ventrally joining hypostomal carina and continuing to mandibular base as a distinct carina, not developed into a flange. Pronotum laterally with a median swelling; mesothorax laterally and ventrally bearing sparse, long, white pubescence; mesoscutum finely punctate with indications of weak transverse striae; horizontal mesopleural furrow indistinct; metapleuron indistinctly puncto-striate; submetapleural carina anteriorly abruptly expanded into an almost quadrate lobe. Propodeum with anterior transverse carina present centrally, separating area superomedia from area basalis, latter with transverse striae. Fore wing with 3*r-m* converging towards 2*r-m*, almost joining at junction with *Rs*. Hind wing with distal abscissa of *Cu*₁ present in membrane, not confluent with *Cu*₁ and *cu-a*. Mid tibia with a longitudinal row of spine-like bristles on outer surface, proximally slender, distally swollen, with an oblique furrow on inner surface. Gaster with sternite 1 0·7 times as long as hind coxa, reaching to well behind level of spiracle; tergites 2–4 smooth and polished with sparse, fine punctures; apex of terminal plate of tergite 8 simple. Ovipositor projecting beyond apex of gaster by at least 3·5 times length of hind tibia, the apex bearing distinct teeth.

Coloration. Black to red. Palps, clypeus, inner orbit of face, emargination of orbit opposite antennal socket, thin line on outer orbit, antero-lateral corner of mesoscutum, tegula, subalar process, posterior 0·3 of scutellum, postscutellum, posterior 0·3 of propodeum, posterior margin of tergites 1–7, fore leg (except coxa and distal part of femur), mid leg with distal end of femur, tibia and tarsal segments 1–4, hind leg with distal end of tibia and basal tarsal segment yellow. Antennal disruptive mark at distal end except for last 1–2 segments which are blackish.

Male. Similar to female but with fore wing length 12 mm; malar space 0·5 times basal mandibular width; gaster with sternite 1 0·9 times as long as hind coxa. Gonosquama with an apical tuft of long hairs. Coloration similar to female.

REMARKS. This large species is structurally rather similar to *L. chadwickii*. The female has a subtly different colour pattern and a longer ovipositor whilst the male is distinct in bearing a tuft of long hair on the gonosquama. *L. malecasta* is only known from Tasmania, Victoria and the southern alps of New South Wales.

MATERIAL EXAMINED

Holotype ♀, **Tasmania** (BMNH).

Paratypes. **New South Wales**: 1 ♂, Mt Kosciusko, Dainer's Gap, x.1929 (*Musgrave*) (AM). **Victoria**: 1 ♀, Warburton, ii-iii (TC). **Tasmania**: 1 ♀ (BMNH).

Labena pudenda sp. n.

(Figs 10, 20, 21)

Female. Large to very large species, fore wing length 13–20 mm. Malar space 0.7 times as long as basal mandibular width. Occipital carina mediodorsally complete, ventrally joining hypostomal carina and forming flange. Pronotum laterally with a median convex swelling; mesothorax laterally and ventrally bearing sparse, short white pubescence; mesoscutum smooth with sparse fine punctures; horizontal mesopleural furrow distinct; mesopleuron smooth and polished; metapleuron smooth and polished; submetapleuron carina anteriorly expanded with a large rounded striate lobe. Propodeum with anterior transverse carina absent centrally so areae superomedia and basalis are confluent. Fore wing with *3r-m* slightly inclined, *2r-m* strongly converging towards *3r-m*, both widely separated at junction with *Rs*. Hind wing with distal abscissa of *Cu*₁ complete. Mid tibia without obvious spine-like bristles on outer surface, proximally slender and slightly flattened, distally swollen. Gaster with sternite 1 0.7–1.0 times as long as hind coxa, reaching behind level of spiracle; tergites 2–4 smooth and polished; apex of terminal plate of tergite 8 simple. Ovipositor projecting beyond apex of gaster by 4.0–4.4 times length of hind tibia, the apex bearing strong teeth.

Coloration. Black to deep red. Palps, labrum, clypeus, inner and outer orbits, ventral corner of propleuron, tegula, subalar process, scutellum, postscutellum, posterolateral corner of propodeum, posterior margin of tergites 1–7 (may be divided medially), fore and mid leg with distal part of coxa, trochanter, femur, distal and proximal ends of tibia and tarsal segments 1–4, hind leg with distal end of each segment including tarsal segment 1 and entire tarsal segments 2–4 yellow.

Male. Similar to female but with fore wing length 10–11 mm; malar space 0.9 times basal mandibular width; gaster with sternite 1 0.9 times as long as hind coxa. Gonosquama distally flattened and fringed almost entirely by very fine hairs. Coloration similar to female.

REMARKS. This large, rather slender species is easily recognized by the very long ovipositor of the female. The tip of this organ is distinctive in having much coarser teeth than are usually found in species of *Labena*. Males have the most specialized gonosquamae of any Australian *Labena* species. *L. pudenda* seems to be a southern temperate forest species and has been recorded from New South Wales, Victoria and the Australian Capital Territory.

MATERIAL EXAMINED

Holotype ♀, **Victoria**: Bogong High Plains, xii.1931 (*Kubala*) (NMV).

Paratypes. **New South Wales**: 1 ♂, Dainer's Gap (36°12S 148°43E), xi.1973 (*Morrow*) (ANIC); 1 ♀, Kosciusko, xii.1922 (*Goldfinch*) (AM); 1 ♀, Mt York, x.1930 (NMV). **Australian Capital Territory**: 1 ♀, Lees Springs, xi.1953 (*Riek*) (ANIC). **Victoria**: 1 ♀, 1 ♂, 'Alps', xii.1910 (NMV); 1 ♀, Mt Buffalo, 1600 m, ii (TC); 1 ♀, 2 ♂, 'Victoria', ii.1901 (*French*) (BMNH); 1 ♀, Yarra Falls, S. Warburton, i.1907 (*Barnard*) (NMV).

CERTONOTUS Kriechbaumer

Certonotus Kriechbaumer, 1889: 308. Type-species: *Certonotus varius* Kriechbaumer, by monotypy.

Asperellus Townes in Townes *et al.*, 1961: 471. Type-species: *Certonotus hinnuleus* Krieger, by original designation. **Syn. n.**

Small to very large insects, fore wing length 4–17 mm; clypeus flat, transverse, margin thin, evenly arcuate; labrum barely projecting; mandible short, stout but tapered, twisted 25–30°, with upper tooth the longer; outer mandibular surface with a groove bearing hairs; malar space trans-striate, usually a little longer than basal mandibular width. Occipital carina dorsally absent; eye not indented next to antennal socket. Antenna slightly clavate, apically pointed, without a flat sensillum. Mesoscutum with transverse rugae, notauli weak, notaular crests very weak. Propodeum usually quite short, convexly rounded with spiracle elliptical; anterior transverse carina usually complete except centrally, other carinae often reduced, area superomedia usually not delineated; gaster inserted high up on propodeum, above level of hind coxae. Fore tibia with a short tooth on outer distal margin; fore tarsus unspecialized; hind coxa of female with an anterior carina continued ventrally as a process, the area behind this carina concave and closely punctate;

tarsal claws simple. Fore wing with *cu-a* opposite or proximal to base of *Rs&M*; *3r-m* usually present, areolet almost triangular, often petiolate above; *2m-cu* sinuous, with two close bullae. Hind wing with distal abscissa of *Cu*₁ present or incomplete or absent; first abscissa of *Cu*₁ shorter than *cu-a*; basal cell slender; *Sc* with one or two hamuli. Gaster quite long, tergite 1 from stout to quite slender, with spiracles before centre; sternite 1 usually reaching nearly to level of spiracles; laterotergites 2–4 membranous, folded under; tergite 8 highly modified, projecting laterally as a pair of prominences at either side of ovipositor base, dorsally with a detached plate projecting through concave orifice in hind margin, tergite 7 often mediodorsally incised. Ovipositor projecting beyond apex of gaster by 3.0–8.0 times length of hind tibia, its apex compressed, the upper valve with weak blunt serrations, the lower valve enclosing the upper and bearing fine file-like teeth.

REMARKS. *Certonotus* is a large genus centred in Australia with a few species present in New Guinea, New Zealand and South America. Previously, the species now included in this taxon were divided between *Certonotus* and *Asperellus* (Townes, 1969; Gauld, 1984) but more detailed study has revealed that the latter genus is almost certainly polyphyletic. In the present work 23 species are recognized as occurring in Australia.

Certonotus species are easily recognized by the possession of transverse rugae on the mesoscutum, a feature immediately distinguishing the genus from all other Australian labenines. *Certonotus* species may inadvertently be confused with Rhyssini, especially *Epirhyssa* species. Unlike rhyssines, which have an undeveloped submetapleural carina, *Certonotus* has a broad expanded lobe present anteriorly. Furthermore, *Certonotus* has fine file-like teeth on the ovipositor apex, not the coarse teeth found in *Epirhyssa* (Gauld, 1984).

The relationships of the Australian species. Gauld (1984) suggested that *Asperellus*, as defined by Townes (1969), was merely a specialized species-group of *Certonotus*. Further study suggests that *Asperellus* is not even a monophyletic group, but rather an assemblage of species of *Certonotus* that lack the distal abscissa of *Cu*₁. The majority of species (*farrugiai*, *pineus*, *mogimbensis*, *zebrus*, *toolangi*, *hinnuleus* and *leeuwinensis*) do comprise a natural group, the *leeuwinensis*-group. All have rather similar propodeal carination, in that the posterior transverse carina is absent but a large smooth area is enclosed by the anterior carina and the lateral carinae; they possess a very small areolet, have one or more spine-like bristles present on the hind tibia and have a slightly convex face. Most have a rather short first sternite, a quite deeply divided tergite 7 and a pronounced lobe on tergite 8. Only in *farrugiai* is tergite 7 barely indented posteriorly. The species *ixion*, *paluma*, *celeus* and *Certonotus* species A would all run to *Asperellus* in Townes' (1969) key but these do not appear to be closely related to the others (i.e. the *leeuwinensis*-group). The first three are closely related to *Certonotus talus* and belong to the *humeralifer*-group, which is defined by having a very deeply divided tergite 7 and possessing rather long narrow processes on tergite 8. The group includes seven Australian species – *humeralifer*, *apicalis*, *talus*, *cestus*, *ixion*, *paluma* and *Certonotus* species A. The New Zealand species *C. fractinervis* apparently also belongs to this group.

The majority of other Australian species (*annulatus*, *nitidulus*, *geniculatus*, *rufescens*, *andrewi*, *avitus*, *sisyphus* and *celeus*) constitute a third group, having a weakly to moderately deeply divided tergite 7, rounded lobes on tergite 8 and a relatively long first sternite. Within the *nitidulus*-group one rather distinctive lineage can be recognized comprising *rufescens*, *geniculatus*, *sisyphus* and *celeus*. These species all have flat lower faces, and most have the posterior end of the lateral propodeal carina broadened to form a raised keel.

The remaining Australian species, *C. monticola*, belongs to the *flaviceps*-group which is characterized by possession of elongate glossae and a very short occipital carinal stub. Males of species in this group are specialized in having a very elongate gaster (with tergite 7 about 1.5 times as long as broad or longer). Frequently the hind margins of the tergites are concave. This elongate form of the gaster is characteristic of wood-boring species in which the male copulates with the female prior to her emergence from the burrow (see Nuttall, 1973). The male of *C. fractinervis* resembles males of the *flaviceps*-group though the structure of the female suggests the species is best placed in the *humeralifer*-group.

The relationships of the species-groups are difficult to determine as there is considerable conflict in the characters. The *leeuwinensis*-group, a holophyletic clade, may well be the sister-lineage of the *humeralifer*-group. Both have a similarly deeply divided tergite 7 and many often possess spine-like bristles on the hind tibia and show reduction in the distal abscissa of *Cu*₁. This arrangement leads to difficulty in placing *C. farrugiai* which has tergite 7 barely divided. The *humeralifer*-group could be paraphyletic with respect to the *leeuwinensis*-group. The *nitidulus*-group could well be a paraphyletic assemblage, the stem group from which all others have arisen, although the *rufescens*-subgroup is clearly a holophyletic clade. The *flaviceps*-group is also undoubtedly a holophyletic clade.

The geographical distribution of the species-groups is as follows:

nitidulus-group: New Guinea, Australia;
rufescens-subgroup: Australia;
humeralifer-group: Australia, New Zealand;
flaviceps-group: Moluccas, New Guinea, tropical Australia;
leeuwiniensis-group: New Guinea, Australia, New Hebrides, New Caldeonia.

Key to species of *Certonotus* occurring in Australia

- 1 Hind wing with distal abscissa of Cu_1 complete 2
- Hind wing with distal abscissa of Cu_1 either incomplete, that is present in membrane but not joining Cu_1 & $cu-a$, or entirely absent 13
- 2 Gaster more or less entirely yellowish or orange-brown, the tergites in dorsal view, unicolorous or slightly infurcate along posterior margin 3
- Gaster dark reddish brown or black, usually with conspicuous yellow spots or bands along margin of tergites, some marks with gaster unicolorous dark brown 7
- 3 Subalar prominence, in dorsal view, strongly raised, with a blunt, back-curved, thorn-like protuberance which is more sharply pointed in the male than the female (Fig. 22); malar space long (Fig. 25), in female 0.9–1.0 times as long as basal mandibular width, in male 0.8–0.9 times as long; submetapleural carinal flange with a ridge delimiting an anterolateral triangular area *rufescens* Morley (p. 133)
- Subalar prominence in dorsal view at most convex, not produced into a spine-like protuberance (Figs 23, 24); malar space fairly short (Fig. 26), in female 0.7–0.8 or male 0.4–0.6 times as long as basal mandibular width; submetapleural carinal flange without a delimited triangular area anterolaterally 4
- 4 Pronotum in dorsal view with part before upper corner strongly convex or pyramidal (Figs 23, 24); anterior transverse carina of propodeum present centrally (Fig. 27); $2r-m$ and $3r-m$ fused anteriorly so areolet is petiolate (Fig. 30) 5
- Pronotum in dorsal view with part before upper corner flat to weakly convex; anterior transverse carina of propodeum absent centrally (Figs 28, 29); $2r-m$ and $3r-m$ joining R_s separately so areolet not petiolate (Fig. 31) 6
- 5 Upper part of pronotum pyramidal in dorsal view (Fig. 24); female with ovipositor about 5 times as long as hind tibia; hind tibia with one spine-like bristle on posterior margin; flagellum entirely black *humeralifer* Krieger (p. 127)
- Upper part of pronotum simply strongly convex in dorsal view (Fig. 23); female with ovipositor 7.5 or more times as long as hind tibia; hind tibia without a spine-like bristle or posterior margin; flagellum with distal end white *apicalis* Morley (p. 122)
- 6 Posterior transverse carina of propodeum centrally strongly raised (Fig. 28); antenna with apical 10 or so segments whitish; spiracular area bounded posteriorly by carina, thus being separated from lateral area *annulatus* Morley (p. 121)
- Posterior transverse carina of propodeum absent centrally (Fig. 29); antenna with apical segments black but with a subapical white band; spiracular area confluent with lateral area *andrewi* sp. n. (p. 121)
- 7 Males and females with tergites 2–5 with yellow band along hind margin 8
- Females with tergites 2–5 with paired yellow spots or the males either with paired yellow spots or without yellow marks at all 9
- 8 Metapleuron centrally with conspicuous longitudinal wrinkles; propodeum with a tubercle below spiracle (Fig. 32); flagellum distally uniformly black; anterolateral part of mesoscutum without yellow marks *geniculatus* Morley (p. 124)
- Metapleuron centrally smooth; propodeum without a tubercle below spiracle (Fig. 33); flagellum distally white-marked; anterolateral part of mesoscutum yellow-marked *nitidulus* Morley (p. 131)
- 9 Subalar prominence bearing a long slender back-curved spine (Fig. 34); female with tergite 8 posteriorly extended into a narrow truncate projection (Fig. 35) *talus* sp. n. (in part) (p. 135)
- Subalar prominence without a spine; female with tergite 8 bluntly rounded apically (Figs 36, 37) 10
- 10 Labium with glossae very long and slender, extending ventrally a distance of approximately the height of the eye; occipital carina represented by a short vestige at its junction with hypostomal carina (Fig. 38); propodeum (at least part behind anterior transverse carina) yellow *monticola* Morley (p. 130)

- Labium with glossae short, barely projecting below head; occipital carina present ventrally, at least as long as abscissa of hypostomal carina between mandible and junction with occipital carina (Fig. 39); propodeum not or only partially yellow-marked behind anterior transverse carina 11
- 11 Propodeum with anterior and posterior transverse carinae strong, complete and almost parallel to each other (Fig. 40); lateromedian carinae not present between transverse carina; hind tibia uniformly reddish; females with malar space brown *sisyphus* sp. n. (p. 134)
- Propodeum with anterior or posterior transverse carina weak or missing in part, the carinae not parallel and often with discernible traces of lateromedian longitudinal carinae between them (Fig. 41); hind tibia proximally pale-marked; females with malar space whitish 12
- 12 Sternite 1 long, extending behind spiracles and being about length of hind coxa; submetapleural carina anteriorly broadened to form a rectangular flange (Fig. 42); mesoscutum with pair of pale stripes extending back from anterior margin *avitus* sp. n. (p. 123)
- Sternite 1 short, reaching at most (in males) to level of spiracles, and being distinctly shorter than length of hind coxa; submetapleural carina anteriorly broadened to form a rounded lobe (Fig. 43); mesoscutum with a median pale rectangular mark *cestus* sp. n. (p. 123)
- 13 Hind wing with distal abscissa of *Cu*₁ absent; hind tibia with posterior margin bearing one or more spine-like bristles 14
- Hind wing with distal abscissa of *Cu*₁ present in membrane, not joining nervellus; hind tibia with posterior margin devoid of spine-like bristles 22
- 14 Tergite 2 of gaster entirely white; alitrunk anteriorly reddish brown, propodeum infusate, gaster in greater part black (Fig. 58); wings uniformly infumate; antenna of female black; female with posterior margin of tergite 7 only slightly indented *farrugiai* sp. n. (p. 126)
- Tergite 2 of gaster yellowish brown, or dark brown or pale spotted but never entirely white (Figs 59–62); alitrunk variously coloured, if brownish then concolorous with much of gaster; wings hyaline or apically infumate; antenna of female with white bands; female with posterior margin deeply indented medially 15
- 15 First segment of gaster exceptionally long and slender, the sternite far longer than length of hind coxa; propodeum with first and second lateral areae clearly defined and separated (Fig. 44); apex of fore wing of female narrowly infumate *celeus* sp. n. (p. 125)
- First segment of gaster stouter, the sternite not longer than hind coxa; propodeum with first and second lateral areae confluent, often not defined laterally (Fig. 45); apex of fore wing not infumate 16
- 16 Gaster more or less uniformly yellowish or orange; female with at least distal two flagellar segments entirely black so white ruptive mark is a subapical band 17
- Gaster predominantly black with white maculae; female with distal end of flagellum white except for tip of apical segment which is black 18
- 17 Pronotum convexly produced before upper hind corner, the convexity almost pyramidal in dorsal view (Fig. 46); female with tergite 9 in dorsal view transverse; female hind tarsus black; male with *3r-m* present *pineus* sp. n. (p. 132)
- Pronotum weakly convex before upper hind corner (Fig. 47); female with tergite 9 in dorsal view elongate; female hind tarsus yellow; male with *3r-m* absent. *mogimbensis* Cheesman (p. 129)
- 18 Tergite 2–5 with hind margin banded with yellow, occasionally with bands very faint so tergite is almost unicolorous 19
- Tergite 2–5 with yellow spots on posterolateral corners, these marks not confluent centrally 21
- 19 Propodeum with area superomedia distinct, hexagonal, with only posterolateral sides rather weak (Fig. 48); tergite 8 produced into long slender processes (Fig. 50); tergites 1–2 not clearly whitish or yellow-marked species A (p. 137)
- Propodeum with area superomedia undefined laterally and posteriorly (Fig. 49); tergite 8 produced into blunt or moderately long processes (Fig. 51); tergites 1–2 clearly whitish or yellow-banded posteriorly (Fig. 59) 20
- 20 Metapleuron closely punctate; lower face distinctly transverse (Fig. 52); hind coxa dorsally brown; propodeum in lateral aspect brownish *leeuwinensis* Turner (p. 128)
- Metapleuron virtually smooth; lower face longer than broad (Fig. 53); hind coxa entirely black; propodeum in lateral aspect predominantly whitish *zebrus* sp. n. (p. 136)
- 21 Pronotum convexly produced before upper hind corner; propodeum in lateral view extensively whitish; metapleuron virtually impunctate; hind tibia with an indistinct yellowish mark proximally *hinnuleus* Krieger (p. 126)

- Pronotum very weakly convex before upper hind corner; propodeum in lateral view brown (Fig. 60); metapleuron closely punctate; hind tibia with proximal 0.5 whitish
toolangi sp. n. (p. 136)
- 22 Subalar prominence bearing a long slender back-curved spine (Fig. 34); female flagellum with a subapical white band, the distal 5 or so segments black..... *talus* sp. n. (in part) (p. 135)
- Subalar prominence simple; flagellum with apical segments white, only extreme distal apex of last segment blackish or entirely black 23
- 23 Tergites 4 and 5 of gaster with anterolateral corners broadly white (Fig. 62); hind coxa in profile rather short and stout, the ovipositor guide reaching to about the centre (Fig. 54); process on tergite 8 very slender; ovipositor about 4 times as long as hind tibia *paluma* sp. n. (p. 132)
- Tergites 4 and 5 of gaster with only small white triangular marks in posterolateral corners (Fig. 61); hind coxa in profile slender, the ovipositor guide reaching about 0.3 of its length (Fig. 55); process on tergite 8 moderately slender; ovipositor about 5.5 times as long as hind tibia
ixion sp. n. (p. 128)

Certonotus andrewi sp. n.

(Fig. 29)

Female. Medium to large-sized species, fore wing length 7–14 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.0–1.1 times as broad as high; malar space 0.7–0.8 times as long as basal mandibular width. Occipital carina ventrally more than twice as long as abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, almost flat, in dorsal view barely projecting beyond scutal margin; subalar prominence moderately convex. Scutellum transversely striate, crest strong; metapleuron smooth and polished; submetapleural carina anteriorly expanded into a moderately broad, rather long lobe; metanotum with very strong tooth opposite anterior end of lateral carina. Propodeum moderately short with anterior transverse carina incomplete centrally; posterior transverse carina absent centrally; lateromedian longitudinal carina present only before anterior carina; pleural carina complete, but weak posteriorly; area superomedia undefined; area spiracularis confluent with first lateral area; first and second lateral area separated by a carina. Fore wing with *3r-m* converging towards *2r-m*, joining *Rs* separately; *2m-cu* joining *M* 0.25 to 0.50 from *3r-m* towards *2r-m*. Hind wing with distal abscissa of *Cu*₁ distinct to wing margin. Hind tibia with posterior margin without spine-like bristles. Gaster with segment 1 short, the sternite 0.5–0.6 times as long as hind coxa, reaching to level of spiracle. Tergite 7 mediodorsally without any indentation; tergite 8 posteriorly with process short and rounded; tergite 9 in dorsal view transverse. Ovipositor projecting beyond apex of gaster by 3.5 to 4.0 times length of hind tibia.

Coloration. Orange-yellow species with frons centrally, vertex, mesoscutal stripes, most of gaster and hind legs more brownish or orange; flagellum black with subapical white band. Pterostigma brown, wings hyaline.

Male. Similar to female.

REMARKS. Very like *C. annulatus* which it resembles in colour, venation, possession of short malar space and an almost flat pronotum. *C. andrewi* appears to be a more southern species than *annulatus* as it has been collected in southern Queensland, New South Wales and Victoria.

MATERIAL EXAMINED

Holotype ♀, **New South Wales:** Heathcote, near Sydney, x.1979 (*Holloway*) (AM).

Paratypes. **Queensland:** 1 ♀, Brisbane, xii.1972 (*Sedlacek*) (TC); 4 ♀, Mt Glorious, near Brisbane, xii.1976 (*Bouček*) (BMNH); 1 ♀, 6 ♂, Mt Glorious, xi (TC). **New South Wales:** 1 ♀, Cabbage Tree Ck, Clyde Mtn, ix.1979 (*Naumann & Cardale*) (ANIC); 1 ♀, Iluka, Clarence R., rain forest, xi.1970 (*McAlpine*) (AM); 1 ♀, Warren, ix.1982 (*Holloway*) (AM). **Victoria:** 1 ♀, 'Victoria' (NMV).

Certonotus annulatus Morley

(Figs 28, 31)

Certonotus annulatus Morley, 1913: 31; Turner, 1919: 551. LECTOTYPE ♀, QUEENSLAND (BMNH), here designated [examined].

Female. Moderately large species, fore wing length 9–13 mm. Labium with glossae very slightly lengthened. Lower face at narrowest point 0.9 times as broad as high; malar space 0.7–0.8 times as long as basal mandibular width. Occipital carina ventrally about as long as abscissa of hypostomal carina between it and

mandibular base. Upper part of pronotum, slightly before posterior corner, very weakly convex, in dorsal view projecting only slightly beyond scutal margin; subalar prominence weakly convex. Scutellum punctate, transverse crest distinct; metapleuron virtually smooth except for a few striae ventrally and posteriorly; submetapleural carina anteriorly expanded into a broad rounded lobe that usually bears concentric striae; metanotum with a blunt tooth opposite anterior end of lateral carina. Propodeum moderately long with anterior transverse carina centrally absent; posterior transverse carina centrally present; lateromedian longitudinal carina complete only anteriorly and with stub behind anterior transverse carina; pleural carina complete; area superomedia indicated, but incomplete anteriorly and laterally; area spiracularis complete; first and second lateral areae separated, distinctly delineated. Fore wing with $3r-m$ converging towards $2r-m$, joining Rs separately; $2m-cu$ joining M 0.2–0.3 from $3r-m$ towards $2r-m$. Hind wing with distal abscissa of Cu_1 distinct to wing margin. Hind tibia with posterior margin without spine-like bristles. Gaster with segment 1 short, the sternite 0.5–0.6 times as long as hind coxa, reaching behind level of spiracle. Tergite 7 mediodorsally with a short, narrow slit on posterior margin; tergite 8 posteriorly with process long and truncate; tergite 9 in dorsal view elongate and weakly rounded posteriorly. Ovipositor projecting beyond apex of gaster by 4.5 times length of hind tibia.

Coloration. Orange species with face and orbits, notauli, subalar prominences, scutellar margins and hind margins of gastral tergites more yellowish; flagellum black with distal 10 or so segments white. Pterostigma blackish, wings very weakly infumate.

Male. Similar to female but with fore wing length 8 mm; malar space 0.4 times basal mandibular width; $3r-m$ present; gaster with segment 1 moderately slender, the sternite 0.5 times as long as hind coxa. Apex of gonosquama flattened, bearing a tuft of long hairs. Coloration as for female.

REMARKS. *C. annulatus* is rather similar to and probably the sister species of *C. andrewi*. The two species are fairly easily separated by the characters given in the key.

C. annulatus seems to be a north Queensland species.

MATERIAL EXAMINED

Lectotype ♀, **Queensland:** Kuranda near Cairns, xii.1901 (BMNH).

Queensland: 2 ♀ (paralectotypes), Kuranda, xii.1901, iv.1902 (BMNH); 1 ♀, Kuranda, ii.1935 (*Burns*) (NMV); 1 ♀, Mission Beach, near Tully, iv.1971 (*Moulds*) (AM); 1 ♀, 2 ♂, Moses Ck, 4 km N. by E. Mt Finnigan (15°47'S 145°17'E), at light, x.1980 (*Cardale*) (ANIC); 2 ♂, Paluma (19°00'S 146°12'E), 900 m, Malaise trap, x.1980 (*Frith*) (ANIC); 1 ♀, Shipton's Flat (15°47'S 145°14'E), at light, x.1980 (*Cardale*) (ANIC).

Certonotus apicalis Morley

(Fig. 23)

Certonotus apicalis Morley, 1913: 31; Turner, 1919: 551. LECTOTYPE ♀, QUEENSLAND (BMNH), here designated [examined]

Female. Large species, fore wing length 12–15 mm. Labium with glossae slightly lengthened. Lower face at narrowest point 1.0–1.1 times as broad as high; malar space 0.7–0.8 times as long as basal mandibular width. Occipital carina ventrally sinuous, more than twice as long as abscissa of hypostomal carina between it and base of mandibles. Upper part of pronotum, slightly before posterior corner, convex, in dorsal view projecting as a rounded protuberance; subalar prominence quite strongly convex. Scutellum punctate, transverse crest weak; metapleuron with fine sparse punctures; submetapleural carina anteriorly expanded into a broad rounded lobe; metanotum with a weak swelling in front of lateral carina. Propodeum moderately short with anterior transverse carina complete; posterior transverse carina present centrally; lateromedian longitudinal carina present before anterior carina only; pleural carina strong anteriorly, weak posteriorly; area superomedia not defined laterally; area spiracularis complete; first and second lateral areae more or less completely separated, the latter usually undefined externally. Fore wing with $3r-m$ fused anteriorly with $2r-m$, so areolet is petiolate; $2m-cu$ joining M 0.20–0.25 basad of $3r-m$. Hind wing with distal abscissa of Cu_1 distinct to wing margin. Hind tibia with posterior margin without spine-like bristles. Gaster with segment 1 short, the sternite 0.5 times as long as hind coxa, not reaching level of spiracle. Tergite 7 mediodorsally divided about 0.5 times its length; tergite 8 posteriorly with long narrow process; tergite 9 in dorsal view transverse, rounded apically. Ovipositor projecting beyond apex of gaster by 7.5 or more times length of hind tibia.

Coloration. Yellowish brown species, antenna black with distal segments white, the apical one or two segments slightly infusate. Pterostigma black, wings weakly infumate.

Male. Similar to female but with fore wing length 9 mm; malar space 0.5 times basal mandibular width;

3r-m fused anteriorly with *2r-m*; gaster with segment 1 short, the sternite 0.7 times as long as hind coxa, apex of gonosquama flattened, with a tuft of long close hairs. Colour similar to female but pterostigma dark brown.

REMARKS. The females of this species are easily distinguished by their very long ovipositors, the apices of which are fairly bluntly pointed. The fore femur is also rather distinctive, being slender proximally, then abruptly inflated proximocentrally. This is most similar to *C. humeralifer* and the two are probably sister-taxa.

C. apicalis is a tropical species, only recorded from Queensland.

MATERIAL EXAMINED

Lectotype ♀, **Queensway**: Kuranda near Cairns, iv.1902 (BMNH).

Queensland: 3 ♀ (paralectotypes), same data as holotype (BMNH); 1 ♂, Kuranda, v-vi.1913 (*Turner*) (BMNH); 1 ♀, Paluma, mv lamp, i.1970 (*Holloway*) (AM).

Certonotus avitus sp. n.

(Figs 41, 42)

Female. Medium-sized species, fore wing length 8–10 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.0 times as broad as high; malar space 0.4–0.6 times as long as basal mandibular width. Occipital carina ventrally sinuous, more than 3 times as long as abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, almost flat, in dorsal view barely projecting beyond scutal margin; subalar prominence weakly convex. Scutellum finely punctate, crest strong; metapleuron finely punctate, obsolescent striae posteriorly; submetapleural carina anteriorly expanded into a rectangular elongate flange; metanotum laterally produced into a stout tooth in front of lateral carina. Propodeum moderately long with anterior transverse carina incomplete centrally; posterior transverse carina absent except laterally; lateromedian longitudinal carina present only before anterior carina; pleural carina incomplete posteriorly; area superomedia indistinct; area spiracularis complete; first and second lateral areae separated, the second not defined laterally. Fore wing with *3r-m* converging towards *2r-m*, widely separated on *Rs*; *2m-cu* joining *M* 0.3 from *3r-m* towards *2r-m*. Hind wing with distal abscissa of *Cu*₁ distinct to wing margin. Hind tibia with posterior margin without spine-like bristles. Gaster with segment 1 long, the sternite 1.2 times as long as hind coxa, reaching well behind level of spiracle. Tergite 7 mediodorsally with indentation to 0.25 of tergite length; tergite 8 posteriorly with short, rounded process; tergite 9 in dorsal view transverse. Ovipositor projecting beyond apex of gaster by 5 times length of hind tibia.

Coloration. Flagellum black, distal apex white; head brown, orbits entirely and all of lower face whitish; alitrunk dark brown, notaular stripes, subalar prominence, tegula, scutellum, postscutellum, mesopleural stripe and posterior part of propodeum/metapleuron yellow. Gaster reddish brown, tergites laterally yellow and with posterolateral yellow spots. Tergite 1 anteriorly yellowish. Anterior two pairs of coxae whitish, hind ones brown with white apices; all tibiae and tarsi infusate; femora brown, distally pale. Pterostigma dark brown; wings hyaline.

Male. Similar to female but with fore wing length 8 mm; malar space 0.3–0.4 basal mandibular width; *3r-m* present; gaster with segment 1 slender, the sternite 1.0 times as long as hind coxa. Gonosquama with apex slightly flattened, with a tuft of close moderately long hairs. Similar in colour to female.

REMARKS. *C. avitus* is a distinctive species with a very characteristic submetapleural carina. For its size this species has a rather large areolet and a fairly long first sternite.

It is known from eastern Australia, from southern Queensland to Victoria.

MATERIAL EXAMINED

Holotype ♀, **New South Wales**: Mt Tomah, Blue Mtns, viii.1979 (*Rodd*) (AM).

Paratypes. **Queensland**: 1 ♀, Eungella, xi (TC); 1 ♀, Mt Glorious, i (TC); 1 ♂, Mt Nebo, viii (TC); 1 ♀, Mt Tamborine, ix-x.1978 (*Galloway*) (BMNH). **Victoria**: 1 ♂, Healesville, xi.1943 (NMV); 1 ♀, King Lake, x.1953 (*Burns*) (NMV); 1 ♂, King Lake, x.1954 (*Burns*) (NMV); 4 ♀, 1 ♂, Toolangi, xi.1982 (*Farrugia*) (BMNH).

Certonotus cestus sp. n.

(Figs 37, 43)

Female. Medium-sized species, fore wing length 9 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.1 times as broad as high; malar space 1.0 times as long as basal mandibular width.

Occipital carina ventrally longer than abscissa of hypostomal carina between it and lobe of mandible. Upper part of pronotum, slightly before posterior corner, weakly convex, in dorsal view barely protruding beyond scutal margin; subalar prominence quite strongly convex. Scutellum coarsely punctate, crest strong; metapleuron small and polished; submetapleural carina anteriorly expanded into a rounded lobe, metanotum barely produced before lateral carina. Propodeum moderately long with anterior transverse carina obsolescent centrally; posterior transverse carina weak but more or less complete; lateromedian longitudinal carina present anteriorly and weakly between transverse carina; pleural carina anteriorly strong, posteriorly weaker or absent; area superomedia more or less distinct, not defined anteriorly; area spiracularis complete; first and second lateral areae separated, the first very short, the second ill-defined externally. Fore wing with $3r-m$ converging towards $2r-m$, joining Rs separately; $2m-cu$ joining M opposite $3r-m$. Hind wing with distal abscissa of Cu_1 distinct to wing margin. Hind tibia with posterior margin with two spine-like bristles. Gaster with segment 1 short and broad posteriorly, the sternite 0.5 times as long as hind coxa, reaching almost to level of spiracle. Tergite 7 mediodorsally with broad indentation; tergite 8 posteriorly short and rounded; tergite 9 in dorsal view very broad. Ovipositor projecting beyond apex of gaster by 6 times length of hind tibia.

Coloration. Very dark brown species, flagellum with a white subapical band; facial, frontal and genal orbits, upper and lower margin of pronotum, mesoscutum in a central quadrate spot and indistinctly laterally, scutellum, postscutellum, subalar prominence, anterior and posterior mesopleural spots, most of hind part of propodeum and metapleuron whitish. Gaster dark brown with large anterolateral spots. Anterior coxa whitish, hind coxa brown with whitish mark. Pterostigma blackish, wings hyaline.

Male. Similar to female but with fore wing length 9 mm; malar space 0.7 times basal mandibular width; $3r-m$ present; gaster with segment 1 quite stout, the sternite 0.5 times as long as hind coxa. Apex of gonosquama with a small lobe that bears scattered long hairs. Colour similar to female but face entirely pale.

REMARKS. This species is readily recognizable by its colour pattern. Structurally it seems to be related to the *C. humeralifer*-group as it has tergite 7 very deeply divided. Tergite 8 is less pronounced apically in this species than others in the *humeralifer*-group.

It is known from Queensland and New South Wales.

HOST RECORD. Buprestidae: *Diadoxus* sp. (ANIC).

MATERIAL EXAMINED

Holotype ♀, New South Wales: State Forest 854, viii.1952 (*Martin*) (ANIC), parasite of *Diadoxus*.

Paratype. Queensland: 1 ♂, viii.1926 (*Jarvis*) (BMNH).

Certonotus geniculatus Morley

(Fig. 32)

Certonotus geniculatus Morley, 1913: 28. LECTOTYPE ♀, VICTORIA (BMNH), here designated [examined].

Female. Large species, fore wing length 12–17 mm. Labium with glossae slightly lengthened. Lower face at narrowest point 1.1–1.2 times as broad as high; malar space 0.9–1.0 times as long as basal mandibular width. Occipital carina ventrally about as long as abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, very weakly convex, in dorsal view barely projecting beyond scutal margin; subalar prominence weakly convex. Scutellum punctate with strong transverse crest; metapleuron longitudinally striate; submetapleural carina anteriorly expanded into a moderately broad lobe; metanotum produced into a tooth opposite anterior end of lateral carina. Propodeum quite short with anterior transverse carina incomplete centrally; posterior transverse carina vestigial; lateromedian longitudinal carina present only as vestige anteriorly; pleural carina strongly raised into tubercle below spiracle, posteriorly obsolescent; area superomedia undefined; area spiracularis not completely delineated posteriorly; first and second lateral areae separated, but not clearly delineated internally or laterally. Fore wing with $3r-m$ and $2r-m$ converging but not joining anteriorly. Hind wing with distal abscissa of Cu_1 distinct to hind margin. Hind tibia with posterior margin without spine-like bristles. Gaster with segment 1 long and narrow, the sternite 1.0–1.3 times as long as hind coxa, reaching behind level of spiracle. Tergite 7 mediodorsally with very small indentation on posterior margin; tergite 8 posteriorly short and rounded. Tergite 9 in dorsal view broad. Ovipositor projecting beyond apex of gaster by 5.5 to 7.0 times length of hind tibia.

Coloration. Antenna black; head black, lower face, frontal and genal orbits yellow. Alitrunk red-brown with periphery of sclerites infuscate, only tegula, scutellum posteriorly, postscutellum and hind end of

propodeum yellow. Gaster reddish brown, tergite 1 anteriorly, laterally and posteriorly yellow, other tergites with lateral and posterior margins yellow. Fore leg yellow, proximal part of femur black; mid leg yellow, coxa basally, femur proximally and tarsus black. Hind leg black, coxa distally, trochanter segments, distal apex of femur, base and apex of tibia yellow. Pterostigma dark brown, wings virtually hyaline.

Male. Similar to female but with fore wing length 11 mm; malar space 0.7–0.9 times basal mandibular width; *3r-m* present; gaster with segment 1 very slender, the sternite 1.3 times as long as hind coxa. Apex of gonosquama flattened with a dense tuft of long hairs. Colour similar to female.

REMARKS. *C. geniculatus* belongs to the *rufescens*-subgroup of the *tasmaniensis*-group. It is probably the sister-species of *C. rufescens*. Both have the prementum and glossae somewhat lengthened, have a very flat face, the anterior portion of the lateral carina strongly raised and the pleural carina raised into a tubercle below the propodeal spiracle. *C. geniculatus* is most easily distinguished by the possession of a longitudinally striate metapleuron.

This is a southern species, only recorded from Victoria.

MATERIAL EXAMINED

Lectotype ♀, **Victoria:** Nulla Wurren, near Berwick (BMNH).

Victoria: 1 ♀, 2 ♂ (paralectotypes), same data as lectotype (BMNH); 1 ♀, Buckland River, xi.1964 (*Neboiss*) (NMV); 1 ♂, Fernshaw (NMV); 1 ♀, 1 ♂, Trafalgar (NMV).

Certonotus celeus sp. n.

(Fig. 44)

Female. Medium-sized species, fore wing length 8–9 mm. Labium with glossae slightly lengthened. Lower face at narrowest point 0.9 times as broad as high; malar space 1.3–1.4 times as long as basal mandibular width. Occipital carina ventrally slightly longer than abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, very weakly convex, in dorsal view projecting slightly beyond mesoscutal margin; subalar prominence moderately convex. Scutellum sparsely punctate with strong crest posteriorly; metapleuron smooth, very sparsely punctate; submetapleural carina anteriorly strongly expanded into a quadrate lobe that is abruptly narrowed posteriorly; metanotum with a weak lateral tooth. Propodeum quite long with anterior transverse carina complete; posterior transverse carina complete; lateromedian longitudinal carina present only anterior to anterior carina; pleural carina complete; area superomedia not defined; area spiracularis clearly delineated; first and second lateral areae distinct, separated. Fore wing with *3r-m* converging towards *2r-m*, joining *Rs* separately; *2m-cu* joining *M* 0.3 from *3r-m* towards *2r-m*. Hind wing with distal abscissa of *Cu*₁ absent. Hind tibia with posterior margin with one spine-like bristle. Gaster with segment 1 very long and narrow, the sternite 1.2–1.6 times as long as hind coxa, reaching well behind level of spiracle. Tergite 7 mediodorsally with shallow indentation; tergite 8 posteriorly short and rounded; tergite 9 in dorsal view short and pointed. Ovipositor projecting beyond apex of gaster by 4.5 times length of hind tibia.

Coloration. Red-brown species, flagellum black with subapical white band, lower face yellowish, anterior leg orange. Pterostigma dark brown; wings hyaline, apex of fore wing strongly infumate.

Putative male. Similar to female but with fore wing length 8 mm; malar space 0.6 times basal mandibular width; *3r-m* present; propodeal carinae weaker; gaster with segment 1 slender, the sternite 0.9 times as long as hind coxa. Apex of gonosquama rounded, with scattered fine hairs. Pale orange, antenna black, head yellowish and wings uniformly hyaline.

REMARKS. A distinctive species on account of the infumate tip to the fore wing of the female, the very long petiole, long hind coxa and rather flat face. It is probably related to *C. rufescens* though it is the only species in this subgroup without the distal abscissa of *Cu*₁. The male, here tentatively associated, has similarly long coxae and a rather flat face but has no clear posterior transverse propodeal carina nor has the wing apices infumate.

It is only known from Queensland.

MATERIAL EXAMINED

Holotype ♀, **Queensland:** Baldy Mtn Rd, via Atherton, Malaise trap, vi.1981 (*Brown*) (QM).

Paratypes. **Queensland:** 1 ♀, same data as holotype (BMNH); 1 ♂, Eungella Nat. Park, xi.1976 (*Bouček*) (BMNH); 1 ♀, Windsor Tableland, iii.1981 (*Storey*) (BMNH).

Certonotus farrugiai sp. n.

(Fig. 58)

Female. Medium-sized species, fore wing length 6–10 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.1–1.2 times as broad as high; malar space 1.2–1.3 times as long as basal mandibular width. Occipital carina ventrally as long as abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, almost flat, in dorsal view barely projecting beyond mesoscutal margin; subalar prominence quite strongly convex and medially raised in dorsal aspect. Scutellum smooth, virtually impunctate with weak transverse carina apically; metapleuron anteriorly smooth, posteriorly with few coarse punctures; submetapleural carina anteriorly expanded into a broad rounded lobe; metanotum with a small lateral tooth before vestige of lateral carina. Propodeum moderately short with anterior transverse carina complete; posterior transverse carina absent; lateromedian longitudinal carina absent; pleural carina present, posteriorly obsolescent; area superomedia undefined; area spiracularis defined except medially; first and second lateral areae confluent. Fore wing with *3r-m* converging towards *2r-m*, joining latter at *Rs* or sometimes slightly separated; *2m-cu* joining *M* slightly basad of *3r-m*. Hind wing with distal abscissa of *Cu*₁ absent. Hind tibia with posterior margin with one spine-like bristle. Gaster with segment 1 short and broad, the sternite 0.4–0.6 times as long as hind coxa, reaching to level of spiracle. Tergite 7 mediodorsally with wide indentation; tergite 8 posteriorly short and broadly rounded; tergite 9 in dorsal view short and broad. Ovipositor projecting beyond apex of gaster by 3.0–3.5 times length of hind tibia.

Coloration. Head and anterior part of alitrunk reddish brown; antenna, much of metapleuron and propodeum black; gaster black, tergite 2 entirely and posterior margins of tergites 3+ white; anteriorly red-brown, partially infuscate; hind leg mainly black. Pterostigma black, wings strongly infumate.

Male. Similar to female but with fore wing length 6 mm; malar space 0.8 times basal mandibular width; *3r-m* present; gaster with segment 1 stout, the sternite 0.6 times as long as hind coxa. Apex of gaster rounded, bearing long scattered hairs. Similar in colour to female but with gaster entirely red; mid leg brownish.

REMARKS. *C. farrugiai* is probably the most distinct species in the genus on account of its striking colour pattern which resembles that of a number of other unrelated species of Hymenoptera occurring in south-eastern Australia. Structurally it is also distinctive in having the posterior margin of tergite 7 only weakly indented.

This species occurs from south-eastern Queensland to Victoria.

MATERIAL EXAMINED

Holotype ♀, **Victoria**: Toolangi, xii.1982 (*Farrugia*) (AM).

Paratypes. **Queensland**: 4 ♀, Mt Glorious, xi–iii (TC); 1 ♀, Mt Nebo, 500 m, iii (TC); 1 ♀, Tambourine, x.1977 (*Galloway*) (BMNH); 1 ♂, Mt Tambourine, iv.1935 (*Turner*) (BMNH); 1 ♀, 2 ♂, Mt Tambourine, x–xii (TC). **Victoria**: 2 ♀, same data as holotype (BMNH).

Certonotus hinnuleus Krieger comb. rev.

Certonotus hinnuleus Krieger, 1901: 123; Turner, 1919: 551. Holotype ♀, NEW SOUTH WALES (MNHU) [not examined].

Certonotus n. sp.; Fullaway, 1942: 244.

Asperellus hinnuleus (Krieger) Townes *et al.*, 1961: 114.

Female. Fairly small species, fore wing length 4–7 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.2 times as broad as high; malar space 1.2–1.4 times as long as basal mandibular width. Occipital carina ventrally almost twice as long as abscissa of hypostomal carina between it and mandible base. Upper part of pronotum, slightly before posterior corner, very convex, in dorsal view appearing as a conical projection; subalar prominence moderately convex. Scutellum sparsely punctate with strong transverse keel; metapleuron smooth and polished; submetapleural carina anteriorly expanded into a broad triangular lobe; metanotum without a tooth. Propodeum short with anterior transverse carina complete, close to anterior margin; posterior transverse carina absent; lateromedian longitudinal carina present before anterior transverse carina; pleural carina present anteriorly, posteriorly absent; area superomedia not delineated; area spiracularis not delineated internally; first and second lateral areae indistinctly delineated, confluent. Fore wing with *3r-m* converging towards *2r-m*, sometimes forming a petiolate areolet or joining at one point on *Rs*; *2m-cu* joining *M* at *3r-m* or slightly basad. Hind wing with distal abscissa of *Cu*₁ absent. Hind tibia with posterior margin with one spine-like bristle. Gaster with segment 1 short and broad, the sternite 0.6 times as long as hind coxa, reaching to level of spiracle. Tergite 7

mediodorsally with large indentation; tergite 8 posteriorly short, broad, truncate; tergite 9 in dorsal view short, rounded posteriorly. Ovipositor projecting beyond apex of gaster by 5.0–5.5 times length of hind tibia.

Coloration. Antenna black, distal flagellar segments white; head white, vertex, interocellar area and frons centrally whitish; mesoscutum brownish or blackish with a yellow central quadrate mark; most of pronotum, tegula, subalar prominence, metapleuron and propodeum almost entirely yellowish; metapleuron brownish. Gaster dark brown with lateral margins and spots near posterolateral corners yellow; legs brownish; tibia proximally and femur distally somewhat paler; fore coxa whitish. Pterostigma blackish, wings very weakly infumate.

Male. Similar to female but with fore wing length 3–6 mm; malar space 0.9–1.0 times basal mandibular width; *3r-m* present; gaster with segment 1 quite stout, the sternite 0.5 times as long as hind coxa; apex of gonosquama quite weakly sclerotized, slightly flattened, bearing long fine hairs. Colour similar to female but mid coxa yellow.

REMARKS. *Certonotus hinnuleus* belongs to the *leeuwinensis*-group. It is the most distinctive taxon in the group on account of the swollen pronotal corner. Structurally it is most closely related to *C. zebrus* from which it differs in having a longer ovipositor and shorter stouter petiole. In Australia it has only been recorded from New South Wales and Victoria. The female from Western Australia referred to by Morley (1913) is a distinct species, *C. ixion*. Townes *et al.* (1961) note that this species occurs in New Caledonia.

MATERIAL EXAMINED

New Caledonia: 2 ♀, 7 km SE. La Foa, i.1945 (*Remington*) (TC) (compared with type); 1 ♂, hills behind Noumea, x.1940 (*Williams*) (TC). **Queensland:** 1 ♂, N. slope, Bluff Range, Biggenden, viii.1976 (*Frauca*) (ANIC); 1 ♂, Broken R., near Eungella, xii.1961 (*McAlpine & Lossin*) (AM); 1 ♀, 1 ♂, Kuranda, v–vi.1913 (*Turner*) (BMNH); 1 ♂, Mackay, 1909 (*Turner*) (BMNH); 3 ♂, Mt Cootha, iv–v (TC); 1 ♂, Mt Glorious, i (TC); 2 ♂, Mt Tambourine, xi.1977 (*Galloway*) (BMNH).

Certonotus humeralifer Krieger

(Figs 24, 26, 27, 30)

Certonotus humeralifer Krieger, 1901: 121. Lectotype ♀, NEW SOUTH WALES (MNHU), designated by Townes *et al.*, 1961: 113 [examined].

Female. Medium to large species, fore wing length 7–14 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.2–1.3 times as broad as high; malar space 0.7–0.8 times as long as basal mandibular width. Occipital carina ventrally sinuous, at least twice as long as abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, very strongly swollen, in dorsal view pyramidal, projecting; subalar prominence strongly convex. Scutellum punctate, crest distinct, metapleuron smooth and polished; submetapleural carina anteriorly expanded into a tooth before lateral carina. Propodeum moderately short with anterior transverse carina weak centrally but usually complete; posterior transverse carina absent; lateromedian longitudinal carina present anteriorly; pleural carina strong anteriorly, posteriorly vestigial; area superomedia not delineated; area spiracularis not clearly delineated posteriorly; first and second lateral area confluent, weakly defined laterally. Fore wing with *3r-m* fused anteriorly with *2r-m*, so areolet petiolate; *2m-cu* joining *M*-basal by 0.2 from *3r-m*. Hind wing with distal abscissa of *Cu*₁ distinct to wing margin. Hind tibia with posterior margin with one spine-like bristle. Gaster with segment 1 short, the sternite 0.5 times as long as hind coxa, reaching to level of spiracle. Tergite 7 mediodorsally with wide indentation narrowing to slit to 0.5 of tergite length; tergite 9 in dorsal view short, rectangular. Ovipositor projecting beyond apex of gaster by 5 times length of hind tibia.

Coloration. Bright yellow species; flagellum, interocellar area, mesoscutum in central spot and scutocutellar groove black; hind tarsus infusate. Pterostigma black, wings hyaline.

Male. Similar to female but with fore wing length 7–8 mm; malar space 0.6 times basal mandibular width; *3r-m* present; gaster with segment 1 quite stout, the sternite 0.5 times as long as hind coxa; apex of gonosquama strongly flattened, with periphery bearing only fine sparse hairs. Similar in colour to female.

REMARKS. The bright yellow ground colour of this species and the conical pronotal process distinguish *C. humeralifer* from other Australian *Certonotus* species. *C. humeralifer* belongs to the *humeralifer*-group; it appears to be most closely related to *C. apicalis*. Both have a characteristically specialized fore femur.

C. humeralifer has been collected in Queensland and New South Wales.

MATERIAL EXAMINED

Lectotype ♀, New South Wales (MNHU).

Queensland: 1 ♂, Brisbane, 1956 (*Ken*) (NMV); 2 ♀, Fraser Island, ix.1930 (BMNH); 1 ♀, 1 ♂, Mt Glorious, 650 m, x-xiii (TC); 1 ♀, Mt Nebo, 500 m, iii (TC); 5 ♀, 1 ♂, Mt Tambourine, x-xi.1977 (*Galloway*) (BMNH); 1 ♀, Mt Tambourine, xii.1911 (*Hacker*) (BMNH); 2 ♀, Mt Tambourine, xi-xii (TC); 1 ♂, Toowoomba, iii (TC). **New South Wales:** 1 ♀, Terrigal, 1900 (*Froggatt*) (BMNH); 1 ♀, 'New South Wales' (NMV).

Certonotus ixion sp. n.

(Figs 55, 61)

Female. Medium-sized species, fore wing length 8 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.2 times as broad as high; malar space 0.9 times as long as basal mandibular width. Occipital carina ventrally slightly longer than abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, weakly convex, in dorsal view parallel with mesoscutal margin; subalar prominence moderately convex. Scutellum closely, finely punctate with strong transverse crest; metapleuron with close shallow punctures; submetapleural carina anteriorly abruptly expanded into a broad lobe. Propodeum moderately short with anterior transverse carina complete; posterior transverse carina almost complete; lateromedian longitudinal carina absent except for vestiges before anterior carina; pleural carina obsolescent posteriorly; area superomedia not delimited laterally; area spiracularis almost complete; first and second lateral areae barely delineated laterally, confluent. Fore wing with *3r-m* strongly converging towards *2r-m*, joining *Rs* separately; *2m-cu* joining *M* at *3r-m*. Hind wing with distal abscissa of *Cu*₁ present over distal 0.5 to wing margin, not joined to first abscissa of *Cu*₁. Hind tibia with posterior margin with a small spine-like bristle. Gaster with segment 1 long and narrow, the sternite 0.8 times as long as hind coxa, reaching behind level of spiracle. Tergite 7 mediodorsally with narrow indentation to 0.5 of length; tergite 8 posteriorly short and truncate; tergite 9 in dorsal view broad. Ovipositor projecting beyond apex of gaster by 5.5 times length of hind tibia.

Coloration. Antenna blackish, apex (except extreme distal part of last segment) whitish; head reddish brown, lower face, frontal orbits and most of genae whitish; alitrunk reddish, peripherally darker; scutellum posteriorly, postscutellum, tegula, subalar prominence and upper margin of pronotum yellowish. Gaster dark red-brown; tergites 1-6 with posterolateral triangular yellow marks, tergites 2-3 with anterolateral pale spots. Legs predominantly reddish brown, anterior two pairs of coxae and distal apices of fore and mid femora whitish. Pterostigma red-brown, wings hyaline.

Male. Quite similar to female but with fore wing length 5-7 mm; malar space 0.6 times basal mandibular width; *3r-m* present; gaster with segment 1 slender, the sternite 1.0 times as long as hind coxa; apex of gaster with a small lobe bearing long scattered hairs. Colour similar to female but with mesopleuron white-marked and pale maculae on gaster smaller, rather inconspicuous, flagellum entirely black.

REMARKS. The species is one of the three *Certonotus* that have incomplete distal abscissa of *Cu*₁. It is most similar to *C. paluma* from which it differs strikingly in colour pattern, length of ovipositor and shape of tergite 8. The coxae are more elongate than in many other species and the sculpture of the alitrunk is coarser than that of *C. paluma*.

C. ixion has been collected in Queensland and Victoria.

MATERIAL EXAMINED

Holotype ♀, **Victoria:** Ferntree Gully, x.1921 (*Burns*) (NMV).

Paratypes. **Queensland:** 1 ♂, Lamington N.P., xi.1961 (*Common & Upton*) (ANIC); 1 ♂, Mt Glorious, xii (TC); 2 ♂, Mt Nebo, 500 m, iii (TC).

Certonotus leeuwinensis Turner comb. rev.

(Figs 49, 52)

Certonotus leeuwinensis Turner, 1919: 551. Holotype ♂, WESTERN AUSTRALIA (BMNH) [examined].

Asperellus leeuwinensis (Turner) Townes *et al.*, 1961: 115.

Female. Medium-sized species, fore wing length 6-7 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.2-1.3 times as broad as high; malar space 1.1-1.2 times as long as basal mandibular width. Occipital carina ventrally weak, only slightly longer than abscissa of hypostomal carina between it and mandibular base. Upper part of pronotum, slightly before posterior corner, weakly convex, in dorsal view slightly protruding from mesoscutal margin; subalar prominence weakly convex. Scutellum sparsely

punctate, with strong transverse keel; metapleuron closely, quite finely punctate; submetapleural carina anteriorly expanded into a moderately broad, triangular lobe; metanotum with weak lateral tooth. Propodeum quite short with anterior transverse carina complete; posterior transverse carina absent; lateromedian longitudinal carina present before anterior transverse carina; pleural carina more or less complete; area superomedia undefined; area spiracularis incomplete internally; first and second lateral areae confluent. Fore wing with $3r-m$ convergent towards $2r-m$ in some specimens; $2m-cu$ joining M just basad of $2r-m$. Hind wing with distal abscissa of Cu_1 absent. Hind tibia with posterior margin with one spine-like bristle. Gaster with segment 1 short, the sternite 0.5 times as long as hind coxa, reaching nearly to level of spiracle. Tergite 7 mediodorsally with indentation to 0.5 its length; tergite 8 posteriorly short and rounded; tergite 9 in dorsal view short and broad. Ovipositor projecting beyond apex of gaster by 5.5 times length of hind tibia.

Coloration. Antenna black with apical segments white (except for distal apex of last segment which is black); head black, orbits entirely whitish, lower face centrally brownish; alitrunk reddish brown, the sclerites often margined with black irregularly; pronotum dorsally as a stripe, ventrally, tegula, subalar prominence, scutellum and postscutellum pale whitish yellow; gaster brownish or even blackish, tergites 1–7 laterally and posteriorly margined with yellow. Legs with fore and mid coxae yellow above, black below; hind coxa brown above, blackish below; anterior two pairs of legs otherwise brownish except for distal apices of femora which are yellow; hind femur brownish; hind tibia darker brown, proximally indistinctly paler, tarsus infusate. Pterostigma dark brown, wings hyaline.

Male. Similar to female but with fore wing length 3–6 mm; malar space 0.9 times basal mandibular width; $3r-m$ present; gaster with segment 1 moderately stout, the sternite 0.6 times as long as hind coxa; apex of gonosquama flattened slightly and bearing long scattered hairs. Colour similar to female but lower face and anterior two pairs of coxae almost entirely yellow.

REMARKS. *Certonotus leeuwinensis* belongs to the *leeuwinensis*-group. It is structurally most similar to *C. toolangi* in having a noticeably punctate metapleuron. The most obvious difference between the two species is in coloration. The gaster of *leeuwinensis* has the hind margins of tergites 2–5 banded with yellow whereas those of *toolangi* are spotted with yellow. The hind tibia of *toolangi* is bicoloured, that of *leeuwinensis* is almost unicolorous. *C. leeuwinensis* has a slightly longer ovipositor and malar space than *toolangi*.

MATERIAL EXAMINED

Holotype ♂, Western Australia: Yallingup near Cape Naturaliste ix–x.1913 (Turner) (BMNH).

New South Wales: 1 ♀, Killara, xii.1935 (Day) (ANIC). Tasmania: 1 ♀, Coles Bay, ii–iii (TC); 1 ♂, Georgetown, xi.1917 (Cole) (NMV); 1 ♀, Mt Barrow, 1200 m, xiii–i (TC). Western Australia: 1 ♀ (paratype), same data as holotype (BMNH); 1 ♂, 21 km SW. by S. Donnybrook (23.44S 115.41E), x.1981 (Naumann & Cardale) (ANIC); 1 ♂, Mt Chudalup, S. of Northcliffe, x.1970 (Colless) (ANIC); 1 ♂, Yallingup, near Cape Naturaliste, ix–x.1913 (Turner) (BMNH).

Certonotus mogimbensis Cheesman comb. rev.

(Fig. 47)

Certonotus mogimbensis Cheesman, 1936: 180. Holotype ♀, New Hebrides (BMNH) [examined].

Asperellus mogimbensis (Cheesman) Townes *et al.*, 1961: 115.

Female. Small species, fore wing length 5 mm. Labium with glossae slightly elongate. Lower face at narrowest point 1.0 times as broad as high; malar space 0.8–1.0 times as long as basal mandibular width. Occipital carina ventrally from slightly shorter to slightly longer than abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, weakly convex, in dorsal view parallel to mesoscutal margin; subalar prominence very weakly convex. Scutellum punctate with strong transverse keel; metapleuron smooth with some fine punctures posteriorly; submetapleural carina anteriorly expanded into a rounded lobe; metanotum without a lateral tooth. Propodeum short with anterior transverse carina complete; posterior transverse carina absent; lateromedian longitudinal carina vestigial; pleural carina complete; area superomedia undefined; area spiracularis not defined internally; first and second lateral areae confluent. Fore wing with $3r-m$ present for half the distance or less from R_s towards M ; $2m-cu$ joining M well distad of $2r-m$. Hind wing with distal abscissa of Cu_1 absent. Hind tibia with posterior margin with one or two spine-like bristles. Gaster with segment 1 short and broad, the sternite 0.5 times as long as hind coxa, reaching to level of spiracle. Tergite 7 mediodorsally with indentation to 0.5 of length; tergite 8 posteriorly long and rounded; tergite 9 in dorsal view elongate. Ovipositor projecting beyond apex of gaster by 4.0–4.5 times length of hind tibia.

Coloration. Antenna black with a subapical broad white band; head whitish; clypeus and mouth parts brownish, frons centrally and interocellar area dark brown. Alitrunk, legs and gaster uniformly orange. Pterostigma dark brown, wings hyaline.

Male. Similar to female but with fore wing length 3–4 mm; malar space 0.9–1.1 times basal mandibular width; *3r-m* absent; gaster with segment 1 moderately slender; the sternite 0.6 times as long as hind coxa; apex of gonosquama with small lobe bearing fine scattered hairs. Similarly coloured to female but with head uniformly orange, flagellum entirely black, hind tibia and tarsus weakly to strongly infuscate, some tergites of gaster infuscate and wings slightly infumate.

REMARKS. *C. mogimbensis* most closely resembles *C. pineus* in colour and structure and the two may be closely related. However, *mogimbensis* is distinctive, not only in having a flatter pronotum but in having *3r-m* incomplete in the male and lacking dark maculae on the mesoscutum. This species is known to occur in tropical Queensland and on Vanuatu (New Hebrides).

MATERIAL EXAMINED

Holotype ♀, New Hebrides: Malekula, Ounua, ii.1929 (*Cheesman*) (BMNH).

Queensland: 1 ♀, 1 ♂, Claudie R, near Mt Lamond, xii.1971 (*McAlpine & Holloway*) (AM); 1 ♂, Shipton's Flat (15-47S 124-14E), x.1980 (*Cardale*) (ANIC).

Certonotus monticola Morley

(Fig. 38)

Certonotus monticola Morley, 1913: 29. Holotype ♀, QUEENSLAND (BMNH) [examined].

Female. Medium-sized species, fore wing length 9–12 mm. Labium with glossae elongate, projecting beyond clypeus by a distance equal to or greater than facial height. Lower face at narrowest point 0.9–1.0 times as broad as high; malar space 0.5–0.6 times as long as basal mandibular width. Occipital carina ventrally obsolescent, represented by a stub that is shorter than abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, weakly convex, in dorsal view barely projecting beyond scutal margin; subalar prominence very weakly convex. Scutellum closely and coarsely punctate, with transverse crest; metapleuron anteriorly punctate, posteriorly and dorsally; submetapleural carina anteriorly abruptly expanded into a broad rounded lobe; metanotum without a tooth before lateral carina. Propodeum quite short with anterior transverse carina centrally incomplete; posterior transverse carina absent; lateromedian longitudinal carina present only before anterior carina; pleural carina complete; area superomedia not delineated; area spiracularis complete, short; first and second lateral areae confluent. Fore wing with *3r-m* converging on *2r-m* but joining *Rs* separately; *2m-cu* joining *M* midway between *3r-m* and *2r-m*. Hind wing with distal abscissa of *Cu*₁ distinct to wing margin. Hind tibia with posterior margin without spine-like bristles. Gaster with segment 1 short and broad, the sternite 0.7 times as long as hind coxa, reaching just beyond level of spiracle. Tergite 7 mediodorsally with small indentation; tergite 8 posteriorly elongate and narrow; tergite 9 in dorsal view long and truncate. Ovipositor projecting beyond apex of gaster by 4.5 times length of hind tibia.

Coloration. A reddish brown species with lower face, frontal and genal orbits, central mesoscutal spot, scutellum, most of pronotum, much of mesopleuron and virtually all of metapleuron/propodeum behind spiracle, yellow. Gaster dark brown, tergites 2+ with anterolateral triangular marks. Fore leg brownish yellow, coxa infuscate; mid leg blackish brown, femur distally yellow marked, coxa darker; hind leg with coxa black with dorsal yellow marks, femur and tarsus strongly infuscate, tibia less strongly infuscate. Pterostigma black, wings weakly infumate.

Male. Slender gaster, otherwise similar to female but with fore wing length 7–11 mm; malar space 0.5–0.6 times basal mandibular width; *3r-m* present; gaster exceptionally elongate with segment 1 quite stout, the sternite 0.6 times as long as hind coxa; gonosquama long, apex a little flattened, with scattered hairs of various length. Male similar in general colour pattern to female, although with fewer yellow maculae.

REMARKS. *C. monticola* belongs to the *flaviceps*-group. It is the only taxon in this complex to occur in Australia where it is easily recognizable by the elongate glossae and short occipital carina. *C. monticola* is known to occur in both north Queensland and Papua New Guinea.

MATERIAL EXAMINED

Holotype ♀, Queensland: Tambourine Mt (BMNH).

Queensland: 1 ♀, Middle Claudie R., Iron Range, x.1974 (*Daniels*) (AM). Papua New Guinea: 1 ♀, Amuk, 165 m, i.1960 (*Maa*) (BPBM); 1 ♀, 2 ♂, Bulolo, ix.1981, ex *Myristica* sp. (*Roberts*) (BMNH); 7 ♀,

3 ♂, Kiunga, Fly River, viii-x.1957 (*Brandt*) (BPBM); 2 ♀, Normanby Is., Wakaiuma, Sewa Bay, xii.1956 (*Brandt*) (BPBM); 1 ♀, 10 mi. W. Vudal, xi.1970 (TC); 1 ♀, Waris, S. of Hollandia, 450-500 m, viii.1959 (*Maa*) (BPBM).

Certonotus nitidulus Morley

(Fig. 33)

Certonotus nitidulus Morley, 1913: 29. Holotype ♂, VICTORIA (BMNH) [examined].

Certonotus tasmaniensis Turner, 1919: 550; Hocking, 1967: 57; Short, 1978: 41. Holotype ♂, TASMANIA (BMNH) [examined]. **Syn. n.**

Female. Medium to large species, fore wing length 7-14 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.0-1.1 times as broad as high; malar space 0.6-0.7 times as long as basal mandibular width. Occipital carina ventrally strong, slightly longer than abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, weakly convex, in dorsal view barely projecting beyond scutal margin; subalar prominence weakly convex. Scutellum punctate, transverse keel strong; metapleuron smooth with isolated punctures; submetapleural carina anteriorly expanded into a broad rounded lobe; metanotum with a weak tooth opposite anterior end of lateral carina. Propodeum quite short with anterior transverse carina centrally incomplete; posterior transverse carina absent; lateromedian longitudinal carina present only before anterior carina; pleural carina present, complete but rather weak; area superomedia undefined; area spiracularis complete, defined posteriorly by an arched carina that is very close to spiracle; first and second lateral areae separated, distally delineated. Fore wing with *3r-m* converging towards *2r-m*, joining *Rs* separately; *2m-cu* joining *M* to 0.3 basad of *3r-m*. Hind wing with distal abscissa of *Cu*₁ distinct to wing margin. Hind tibia with posterior margin without spine-like bristles. Gaster with segment 1 short, the sternite 0.6 times as long as hind coxa, reaching behind level of spiracle. Tergite 7 mediodorsally with indentation almost to 0.5 length of tergite; tergite 8 posteriorly short and rounded; tergite 9 in dorsal view transverse. Ovipositor projecting beyond apex of gaster by 5.0 times length of hind tibia.

Coloration. Colour somewhat variable but generally with antenna black, distally, except for apex of last segment, white. Head red-brown, lower face laterally to entirely, genal and frontal orbits pale yellow. Alitrunk reddish brown, yellow marks on pronotum medially, anterior 'corners' and central spot on mesoscutum, scutellum laterally, tegula, subalar prominence, anterior and posterior mesopleural spots, postscutellum and hind part of propodeum. Gaster reddish with tergites posteriorly and laterally yellowish margined, and also with spots in anterolateral corners. Fore leg yellow, femur red centrally, peripherally black with distal apex yellow. Mid leg similar with coxa black-marked and tibia and tarsus infusate. Hind leg as mid leg but with coxa reddish brown, ventrally black. Pterostigma black, wings hyaline.

Male. Similar to female but with fore wing length 7-10 mm; malar space 0.4-0.6 times basal mandibular width; *3r-m* present; gaster with segment 1 moderately slender, 0.6 times as long as hind coxa; apex of gonosquama flattened, bearing two widely separated dense tufts of long hairs. Similarly coloured to female.

REMARKS. *C. nitidulus* is apparently one of the commonest species in the genus as it has adapted to parasitizing an introduced siricid in *Pinus radiata* plantations in Victoria and Tasmania (Hocking, 1967). In coloration *C. nitidulus* most strongly resembles *C. geniculatus* (from which it can be separated by reference to couplet 8 in the key) but structurally it is most similar to *C. annulatus* and *C. andrewi*. *C. nitidulus* differs from both in colour pattern and in the form of the propodeal carinae. This is a quite widespread species in the south-east, extending from southern Queensland to Tasmania.

HOST RECORDS. Siricidae: *Sirex noctilio* F. (Hocking, 1967).

MATERIAL EXAMINED

Holotype ♂ (*Certonotus nitidulus* Morley), **Victoria** (BMNH). Holotype ♂ (*Certonotus tasmaniensis* Turner), **Tasmania**: Mt Wellington, i-ii.1913 (*Turner*) (BMNH).

Queensland: 1 ♀, Mt Glorious, xi (TC); 1 ♂, Mt Norman area, Wallangarra, x.1972 (*Monteith*) (ANIC). **New South Wales:** 1 ♀, Barrington Nat. Park, i (TC); 1 ♀, Boyd River crossing, Kanangra-Boyd Nat. Park, xii.1977 (*Daniels*) (AM); 1 ♂, Leather Barrel Ck, Kosciusko, xi.1961 (*Colless*) (ANIC); 1 ♀, Lord Howe Is., ii-iii.1957 (*Leipa*) (BPBM); 1 ♂, Monga, x.1957 (*Riek*) (ANIC); 1 ♀, Moonee, xi.1947 (NMV); 1 ♂, Moss Vale, xi.1919 (*Duquet*) (AM); 1 ♀, 2 ♂, Mt Tomah, xi.1983 (*Rodd*) (AM); 1 ♂, Pebbly Beach, xi.1960 (*Common & Upton*) (ANIC); 1 ♂, Tubrabucca, xi.1953 (*Burns*) (NMV). **Victoria:** 1 ♀, Dynamite Ck, Bonang Hwy, x.1961 (*Colless*) (ANIC); 1 ♀, Harrietteville, i.1924 (*Oke*) (NMV); 3 ♂, Healesville,

xi.1943 (*Oke*) (NMV); 2 ♀, 1 ♂, South Melbourne, breeding cages, x.1969, ex *Sirex* sp. (*Waugh*) (NMV); 3 ♀, 3 ♂, Mirboo North, x.1967, ex *Sirex noctilio* (*Elliott*) (ANIC); 3 ♀, Mt Dandenong, 300 m, ii (TC); 3 ♂, Mt Buffalo, 1600 m, ii (TC); 1 ♀, 1 ♂, Noorimbee, xi.1965 (*Neboiss*) (NMV); 5 ♂, Toolangi, xii.1982 (*Farrugia*) (BMNH); 5 ♀, Toolangi, i-ii.1983 (*Farrugia & Gauld*) (BMNH); 2 ♀, Warburton, ii-iii (TC); 8 ♀, 2 ♂, Vic. Dept Agric., ii.1968, ex *Pinus* logs (*Irvine*) (ANIC). **Tasmania:** 1 ♀, Harrison Ck, between Cracroft and Blakes Opening, ii.1966 (*Neboiss*) (NMV); 1 ♀, E. Blakes Opening, ii.1966 (*Neboiss*) (NMV); 1 ♀, 1 ♂, Bruny Is., vii.1964, from *Pinus radiata* (*Wilson & Hocking*) (AM); 1 ♀, Catamaran, ii (TC); 1 ♀, Collinsville, 300 m, ii.1983 (*Gauld*) (BMNH); 2 ♀, Frenchman's Gap Trig at Franklin River, ii-iii (TC); 1 ♀, Geeveston, ii (TC); 1 ♀, 1 ♂, Hartz Mtns, ii-iii (TC); 1 ♀, Hellyer Gorge, ii.1983 (*Naumann & Cardale*) (ANIC); 1 ♀, Hellyer Gorge, xii.1981 (*Naumann & Cardale*) (ANIC); 2 ♀, Hellyer Gorge, ii.1967 (*Riek*) (ANIC); 1 ♂, Hellyer Gorge, 300 m, i-ii (TC); 1 ♀, Huon-Picton Junction, ii.1967 (*Riek*) (ANIC); 1 ♂, King William Ck, xii.1981 (*Gauld*) (BMNH); 2 ♀, 1 ♂, King William Range i (TC); 28 ♀, 18 ♂, Launawanna, Bruny Is., ix-x.1964 (*Hocking*) (ANIC, BMNH, TC); 1 ♀, 1 ♂, Mt Barrow, 300 m, xii-i (TC).

Certonotus paluma sp. n.

(Figs 54, 62)

Female. Medium-sized species, fore wing length 8–10 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.1–1.2 times as broad as high; malar space 0.8 times as long as basal mandibular width. Occipital carina ventrally as long as abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, very weakly convex, in dorsal view almost parallel with mesoscutal margin; subalar prominence weakly convex. Scutellum sparsely punctate, with a posterior transverse crest; metapleuron polished, smooth, virtually impunctate; submetapleural carina anteriorly expanded into a broad rounded lobe; metanotum barely produced opposite anterior margin of lateral carina. Propodeum quite short with anterior transverse carina complete; posterior transverse carina present at least centrally; lateromedian longitudinal carina present only anterior to anterior transverse carina; pleural carina complete anteriorly, posteriorly obsolescent; area superomedia not bounded laterally; area spiracularis completely delineated; first and second lateral areae separated by carina. Fore wing with 3*r-m* converging towards 2*r-m*, joining the latter at *Rs*; 2*m-cu* joining *M* at 3*r-m*. Hind wing with distal abscissa of *Cu*₁ present over distal 0.5 to wing margin, not joined to first abscissa of *Cu*₁. Hind tibia with posterior margin without spine-like bristles. Gaster with segment 1 long and narrow, the sternite 0.7 times as long as hind coxa, reaching to level of spiracle. Tergite 7 mediodorsally with narrow indentation, over 0.5 of its length; tergite 8 posteriorly long and narrow; tergite 9 in dorsal view short and pointed. Ovipositor projecting beyond apex of gaster by 4 times length of hind tibia.

Coloration. Antenna black, distally white with extreme apex of last segment black; head black with face and orbits white; alitrunk black or reddish black, with central mesoscutal stripe, scutellum, pronotum, tegula, subalar prominence, mesopleuron centrally, metapleuron and propodeum laterally white; gaster black with very large lateral triangular areas white. Anterior two pairs of legs white with femora, tibiae and tarsi variously infusate; hind leg black, coxa dorsally with white spot. Pterostigma blackish, wings hyaline.

Male. Unknown.

REMARKS. *C. paluma* is one of the three quite closely related *Certonotus* species that have an incomplete distal abscissa of *Cu*₁ in the hind wing. It is distinguishable from *Certonotus* sp. A by its unspecialized subalar prominence. It is structurally similar to *C. ixion*, from which it may be separated by reference to the key.

MATERIAL EXAMINED

Holotype ♀, **Queensland:** Paluma, 900 m (19-00S 146-12E), x.1980, ex Malaise trap (*Frith*) (ANIC).

Paratype. **Queensland:** 1 ♀, Windsor Tableland, iii.1981 (*Storey*) (BMNH).

Certonotus pineus sp. n.

(Figs 45, 46)

Female. Medium-sized species, fore wing length 7–9 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.0–1.1 times as broad as high; malar space 0.9–1.0 times as long as basal mandibular width. Occipital carina ventrally almost 3 times as long as abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, very convex, in dorsal view subpyramidal; subalar prominence moderately convex. Scutellum moderately, closely punctate, trans-

verse keel weak; metapleuron anteriorly smooth, posteriorly punctate; submetapleural carina anteriorly expanded into a broad almost quadrate lobe; metanotum with a very weak tooth before vestige of lateral carina. Propodeum quite short with anterior transverse carina present, very close to anterior part of propodeum; posterior transverse carina absent; lateromedian longitudinal carina vestigial before anterior carina, otherwise absent; pleural carina more or less complete; area superomedia undefined; area spiracularis more or less complete except internally; first and second lateral areae not separated. Fore wing with *3r-m* only slightly convergent towards *2r-m*, joining *Rs* away from *2r-m*, making areolet quadrate; *2m-cu* joining *M* at *3r-m*. Hind wing with distal abscissa of *Cu*₁ absent. Hind tibia with posterior margin with one spine-like bristle. Gaster with segment 1 short and broad, the sternite 0.3 times as long as hind coxa, just not reaching level of spiracle. Tergite 7 mediodorsally with indentation to 0.5 its length; tergite 8 posteriorly long and rounded; tergite 9 in dorsal view short and broad. Ovipositor projecting beyond apex of gaster by 4.5 times length of hind tibia.

Coloration. Antenna black, with subapical white band; head yellowish, only interocellar area and edges of mandibles blackish. Alitrunk and gaster yellowish; mesoscutum with lateral marks, anterocentrally infusate; tip of tergite 8 blackish. Legs yellow, hind tarsus and sometimes distal apex of tibia blackish. Pterostigma black, wings hyaline.

Male. Similar to female but with fore wing length 4 mm; malar space 0.7 times basal mandibular width; *3r-m* present; gaster with segment 1 quite stout, the sternite 0.3 times as long as hind coxa; apex of gonosquama rounded, bearing scattered hairs. Similar in colour to female but with yellowish areas a little paler, more strongly contrasted with infusate areas; flagellar white mark very indistinct.

REMARKS. A stocky species easily recognized by the almost pyramidal pronotal convexity. The virtually quadrate areolet and very short first sternite are also quite characteristic of this species. *C. pineus* is only known to occur in Queensland.

MATERIAL EXAMINED

Holotype ♀, **Queensland**: Moses Ck, 45 km N. by E. Mt Finnigan (15.47S 145.17E), x.1980 (*Cardale*) (ANIC).

Paratypes. **Queensland**: 1 ♀, Lake Barrine, ii.1935 (*Burns*) (NMV); 1 ♂, Mt Webb Nat. Park (15.04S 145.07E), iv.1981 (*Naumann*) (ANIC); 1 ♂, Palm Is. near Townsville, x (TC).

Certonotus rufescens Morley

(Figs 22, 25)

Certonotus rufescens Morley, 1913: 30. LECTOTYPE ♀, QUEENSLAND (BMNH), here designated [examined].

Female. Moderately large to large species, fore wing length 8–16 mm. Labium with glossae slightly lengthened. Lower face at narrowest point 0.9–1.0 times as broad as high; malar space 0.9–1.0 times as long as basal mandibular width. Occipital carina ventrally rather straight, more than twice as long as abscissa of hypostomal carina between it and mandible base. Upper part of pronotum, slightly before posterior corner, weakly convex, in dorsal view rounded, just protruding beyond scutal margin; subalar prominence very strongly raised, in dorsal view with a blunt, back-curved, thorn-like protuberance. Scutellum punctate, with a moderately strong transverse crest; metapleuron smooth, virtually impunctate; submetapleural carina anteriorly expanded into a broad almost quadrate lobe which usually has ridge near anterior corner delimiting a narrow triangular area; metanotum with small tooth opposite anterior end of lateral carina. Propodeum moderately long with anterior transverse carina complete; posterior transverse carina present as lateral vestige; lateromedian longitudinal carina present before anterior carina; pleural carina very strong anteriorly, absent behind anterior carina; area superomedia not delineated laterally; area spiracularis complete; first and second lateral areae confluent, not delineated laterally. Fore wing with *3r-m* converging towards *2r-m* and joining latter at *Rs*; *2m-cu* joining *M* at *3r-m* to 0.3 towards *2r-m*. Hind wing with distal abscissa of *Cu*₁ distinct to wing margin. Hind tibia with posterior margin with one to three spine-like bristles. Gaster with segment 1 long and narrow, the sternite 0.9–1.0 times as long as hind coxa, reaching behind level of spiracle. Tergite 7 mediodorsally at most only slightly indented on posterior margin; tergite 8 posteriorly with process short and rounded; tergite 9 in dorsal view elongated and bluntly pointed posteriorly. Ovipositor projecting beyond apex of gaster by 4–5 times length of hind tibia.

Coloration. Brownish orange; flagellum black with a white subapical band which is usually well developed but is entirely absent in specimens from the northern part of the range. Pterostigma dark brown, wings hyaline.

Male. Similar to female but with fore wing length 5–7 mm; malar space 0.8–0.9 times basal mandibular

width; *3r-m* present; gaster with segment 1 long, slender, the sternite 0.8–1.0 times as long as hind coxa; apex of gonosquama simply truncate, not broadened, but with long sparse hairs. Similarly coloured to female, flagellum without a white band.

REMARKS. *C. rufescens* is easily distinguished from other Australian species by the thorn-like subalar prominence. The face of this species is flatter than most other *Certonotus* and laterally it is abruptly, almost angularly rounded before the malar space. The characteristic submetapleural carina and possession of a strong, usually Y-shaped vestigial carina above the insertion of the hind coxa are useful confirmatory characters. A widespread species extending from northern Queensland south to near Melbourne, Victoria.

MATERIAL EXAMINED

Lectotype ♀, **Queensland**: Mackay, ix.1901 (BMNH).

Queensland: 2 ♀ (paralectotypes), same data as lectotype (BMNH); 2 ♂, Mackay, 1909 (BMNH); 1 ♀, Montville, ix.1935 (*Burns*) (NMV); 1 ♂, Moses Ck, 4 km N. by E. Mt Finnigan (15°47'S 145°17'E), x.1980, at light (*Cardale*) (ANIC); 1 ♀, Mt Glorious, xii.1979 (*Galloway*) (BMNH); 1 ♀, Mt Glorious near Brisbane, xii.1976 (*Bouček*) (BMNH); 3 ♂, Mt Glorious, i–iii (TC); 2 ♀, Mt Tambourine, ix–x.1978 (*Galloway*) (BMNH); 2 ♀, 4 ♂, Mt Tambourine, x–xi.1977 (*Galloway*) (BMNH). **New South Wales**: 1 ♀, 19 km S. Coff's Harbour, i.1958 (*Riek*) (ANIC); 1 ♂, Otford, xii.1962 (*Colless*) (BMNH); 1 ♀, Sassafrass Gully, Springwood, ix.1972 (*McAlpine*) (AM). **Victoria**: 2 ♀, Toolangi, i–ii.1983 (*Farrugia & Gauld*) (BMNH); 1 ♂, Yellingbo, xi.1976 (*Neboiss*) (NMV).

Certonotus sisypus sp. n.

(Figs 36, 39, 40)

[*Certonotus hinnuleus* Krieger; Morley 1913: 32. Misidentification.]

Female. Medium to large-sized species, fore wing length 8–18 mm. Labium with glossae slightly lengthened. Lower face at narrowest point 1.1–1.3 times as broad as high; malar space 0.9–1.0 times as long as basal mandibular width. Occipital carina ventrally sinuous, much longer than abscissa of hypostomal carina between it and mandibular base. Upper part of pronotum, slightly before posterior corner, weakly convex, in dorsal view projecting slightly beyond scutal margin, subalar prominence very strongly convex, in dorsal view slightly pyramidal. Scutellum sparsely punctate, transverse crest distinct; metapleuron smooth with scattered punctures, on larger specimens with punctures closer; submetapleural carina anteriorly expanded into a rectangular flange; metanotum with strong tooth opposite end of lateral carina. Propodeum moderately long with anterior transverse carina complete; posterior transverse carina strong, complete, almost parallel to anterior carina; lateromedian longitudinal carina present only as vestiges before anterior carina; pleural carina weak, posteriorly evanescent; area superomedial not defined; area spiracularis complete; first and second lateral areae clearly separated though latter weakly defined externally. Fore wing with *3r-m* strongly converging towards an almost vertical *2r-m*, joining *Rs* separately; *2m-cu* joining *M* 0.2 from *3r-m* towards *2r-m*. Hind wing with distal abscissa of *Cu*₁ distinct to wing margin. Hind tibia with posterior margin with one to three spine-like bristles. Gaster with segment 1 long and narrow, the sternite 1.0–1.2 times as long as hind coxa, reaching behind level of spiracle. Tergite 7 mediodorsally with wide indentation to 0.5 length of tergite; tergite 8 posteriorly short and rounded; tergite 9 in dorsal view as long as wide with blunt point posteriorly. Ovipositor projecting beyond apex of gaster by 4.5 times length of hind tibia.

Coloration. Reddish brown, flagellum darker with subapical white band; clypeus, facial, frontal and genal orbits. Subalar prominence, pair of central stripes on mesoscutum, scutellum, mesopleural spot, spots in posterolateral corners of tergites 1+ and also on lateral margins of 3+ yellow. Legs yellowish brown, anterior two pairs of coxae and distal apex of mid femur yellow. Pterostigma dark brown, wings hyaline.

Male. Similar to female but with fore wing length 8 mm; malar space 0.7 times basal mandibular width; *3r-m* present; gaster with segment 1 slender, the sternite 1.1 times as long as hind coxa; apex of gonosquama with a small angulate lobe that bears scattered long hairs. Similar in colour to female but with face entirely yellow, mid tibia yellow and yellow maculae on gaster virtually absent.

REMARKS. The fairly elongate petiole, rather flat face and posteriorly flanged lateral propodeal carina suggest this species is related to *C. rufescens* though the pleural carina is not tuberculate as it is in *rufescens* and *geniculatus*. Superficially *C. sisypus* is similar to *C. avitus* from which it can be distinguished, not only by the characters in the key, but also in having a distinctly longer prementum and having the hypostomal and occipital carinae meeting further from the base of the mandible than the basal mandibular width.

Widely distributed in the south-east of Australia; recorded from New South Wales, Victoria and Tasmania.

MATERIAL EXAMINED

Holotype ♀, **Victoria**: Toolangi, xi-xii.1982 (*Farrugia & Gauld*) (AM).

Paratypes. **Victoria**: 8 ♀, 1 ♂, same data as holotype (BMNH). **New South Wales**: 2 ♀, Acacia Plateau, 3000 ft, x.1961 (*Common & Upton*) (ANIC). **Tasmania**: 1 ♀, Duck River, 6 km SE. Roger R., xii.1974 (*Neboiss*) (NMV); 1 ♀, Meridith R., 20 km from Corinna, i.1954 (*Campbell*) (ANIC); 1 ♀, Mt Field Nat. Park, 250 m, i-ii.1983 (*Gauld*) (BMNH); 1 ♀, Picton R. bridge, i.1983 (*Gauld*) (BMNH); 1 ♀, no data (ANIC).

Certonotus talus sp. n.

(Figs 34, 35)

Female. Medium-sized species, fore wing length 8–12 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.1 times as broad as high; malar space 0.7–0.8 times as long as basal mandibular width. Occipital carina ventrally more than twice as long as abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, very weakly convex, in dorsal view barely projecting beyond scutal margin; subalar prominence convex, with a long sharp back-curved spine. Scutellum punctate with strong transverse keel; metapleuron very sparsely punctate; submetapleural carina anteriorly expanded into a broad triangular lobe; metanotum with a large tooth before anterior end of lateral carina. Propodeum moderately long with anterior transverse carina complete; posterior transverse carina almost complete; lateromedian longitudinal carina vestigial, discernible only before anterior carina; pleural carina strong anteriorly, posteriorly poorly developed or obsolescent; area supermedia not delineated; area spiracularis complete, posteriorly very weakly delineated; first and second lateral areae present, separated by strong carina. Fore wing with *3r-m* converging towards *2r-m*, joining latter at *Rs*; *2m-cu* joining *M* at *3r-m*. Hind wing with distal abscissa of *Cu*₁ distinct to wing margin. Hind tibia with posterior margin with or without one spine-like bristle. Gaster with segment 1 short, the sternite 0.8–1.0 times as long as hind coxa, reaching behind level of spiracle. Tergite 7 mediodorsally with wide indentation almost to 0.7 length of tergite; tergite 8 posteriorly with long, narrow process; tergite 9 in dorsal view long and evenly rounded. Ovipositor projecting beyond apex of gaster by 5 times length of hind tibia.

Coloration. Antenna black with subapical white band; head reddish brown, orbits and clypeus entirely pale; alitrunk reddish, mesoscutum with longitudinal stripes, tegula, subalar prominence, scutellum partly, postscutellum, anterior mesopleural spot and paired spots on hind edge of propodeum yellow; gaster reddish, lateral margins of all tergites yellow and tergites also with paired large yellow spots in posterolateral corners. Fore and mid legs yellow, femur for proximal 0.7 and tibia externally reddish, distal tarsal segment blackish; hind leg virtually entirely reddish brown, tarsus infuscate. Pterostigma brown, wings hyaline.

Male. Unknown.

REMARKS. The possession of a long, backwardly curved, slender spine arising from the subalar prominence immediately distinguishes *talus* from all other Australian *Certonotus*. It appears to belong to the *humeralifer*-group but differs in having a more slender petiole with a much longer sternite. One specimen has asymmetric hind wings; the left wing has the distal abscissa of *Cu*₁ incomplete, not joining *Cu*₁ and *cu-a*, whilst in the right wing the vein is complete. This incomplete condition is found in *C. ixion* and *paluma* and we believe these are closely related species. All have similarly modified posterior gastral tergites, and rather small, oblique areolets. The petiole is more slender in these species than in other taxa in this group and the sternite is longer.

C. talus occurs in New South Wales and Victoria and has been collected in subtropical and temperate wet forest.

MATERIAL EXAMINED

Holotype ♀, **New South Wales**: Dorriggo Nat. Park, E. end of Blackbutt Track, 710 m, ii-iii.1980, in subtropical rainforest (*Newtown & Thayer*) (ANIC).

Paratypes. **Victoria**: 2 ♀, Toolangi, xi.1982 (*Farrugia*) (BMNH). **New South Wales**: 1 ♀, Tubrabucca, i.1948 (*Burns*) (NMV).

Certonotus toolangi sp. n.

(Fig. 60)

Female. Medium-sized species, fore wing length 6–7 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.1 times as broad as high; malar space 0.9–1.1 times as long as basal mandibular width. Occipital carina ventrally as long as basal mandibular width. Occipital carina ventrally as long as or slightly longer than abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, almost flat, in dorsal view parallel to mesoscutal margin; subalar prominence moderately convex. Scutellum sparsely punctate, transverse keel weak; metapleuron with shallow coarse close punctures; submetapleural carina anteriorly expanded into a broad triangular lobe; metanotum with a weak tooth laterally. Propodeum quite short with anterior transverse carina complete; posterior transverse carina absent; lateromedian longitudinal carina vestigial, only present before anterior transverse carina; pleural carina present anteriorly; area superomedia undefined; area spiracularis incompletely defined internally; first and second lateral areae confluent, undefined laterally. Fore wing with *3r-m* convergent towards *2r-m*, joining *Rs* separately; *2m-cu* joining *M* very near *3r-m*. Hind wing with distal abscissa of *Cu*₁ absent. Hind tibia with posterior margin with one spine-like bristle. Gaster with segment 1 short and broad, the sternite 0.6 times as long as hind coxa, just reaching level of spiracle. Tergite 7 mediodorsally with indentation to 0.5 of length; tergite 8 posteriorly short and rounded; tergite 9 in dorsal view short and broad. Ovipositor projecting beyond apex of gaster by 4.0–4.5 times length of hind tibia.

Coloration. Very similarly coloured to *leeuwinensis* but differing in having the anterior two pairs of coxae entirely pale and the tibiae with at least proximal 0.5 whitish and mesoscutum centrally with a pair of short yellowish stripes.

Male. Unknown.

REMARKS. *C. toolangi* belongs to the *leeuwinensis*-group. It is most readily distinguishable by its colour pattern. Structurally it is rather similar to *C. leeuwinensis* from which it may be distinguished by its shorter malar space and ovipositor. It is only known from the south-east of Australia, where it has been taken in wet sclerophyll forest.

MATERIAL EXAMINED

Holotype ♀, New South Wales: New England Nat. Park, x.1962 (*Colless*) (ANIC).

Paratypes. Victoria: 2 ♀, Toolangi, xi.1982 (*Farrugia*) (BMNH); 1 ♀, Toolangi, xii.1982 (*Farrugia & Gauld*) (BMNH).

Certonotus zebrus sp. n.

(Figs 51, 53, 59)

Female. Medium-sized species, fore wing length 7–8 mm. Labium with glossae unspecialized. Lower face at narrowest point 0.8–0.9 times as broad as high; malar space 0.8–0.9 times as long as basal mandibular width. Occipital carina ventrally weak, nearly twice as long as abscissa of hypostomal carina between it and mandibular base. Upper part of pronotum, slightly before posterior corner, very weakly convex, in dorsal view parallel with mesoscutal margin; subalar prominence strongly convex, centrally somewhat produced. Scutellum sparsely punctate, transverse crest quite weak; metapleuron anteriorly smooth, posteriorly with scattered punctures; submetapleural carina anteriorly expanded into a broad rounded lobe; metanotum with a weak tooth opposite anterior end of lateral carina. Propodeum short with anterior transverse carina complete; posterior transverse carina absent; lateromedian longitudinal carina discernible as traces before anterior transverse carina; pleural carina incomplete posteriorly; area superomedia not delineated; area spiracularis virtually complete; first and second lateral areae confluent, not defined laterally. Fore wing with *3r-m* converging towards *2r-m*, well separated at *Rs*; *2m-cu* joining *M* 0.3 from *3r-m* towards *2r-m*. Hind wing with distal abscissa of *Cu*₁ absent. Hind tibia with posterior margin with one spine-like bristle. Gaster with segment 1 long, the sternite 0.6 times as long as hind coxa, just reaching level of spiracle. Tergite 7 mediodorsally with indentation to 0.5 its length; tergite 8 posteriorly short and rounded posteriorly. Ovipositor projecting beyond apex of gaster by 4 times length of hind tibia.

Coloration. A black species that sometimes has pale yellow-white marks on distal flagellar segments (except extreme apex of distal one); lower face entirely, orbits, most of pronotum, tegula, scutellum, postscutellum, subalar prominence, mesopleural stripe, most of mesopleuron and propodeum laterally and posteriorly, base of petiole, posterior and lateral margins of gastral tergites whitish. Anterior two pairs of legs whitish, femora and tibiae centrally, tarsi partly brownish marked. Hind leg black. Pterostigma blackish, wings hyaline.

Male. Similar to female but with fore wing length 3 mm; malar space 0.7 times basal mandibular width; 3*r-m* present; gaster with segment 1 quite stout, the sternite 0.5 times as long as hind coxa; apex of gonosquama flattened slightly with scattered hairs. Similarly coloured to female but with flagellum entirely black as is most of mesopleuron and metapleuron.

REMARKS. The holotype differs from the female paratype in having entirely black antennae. *C. zebrus* belongs to the *leeuwinensis*-group. It is the only species in the complex which is virtually entirely black and white. Structurally it is rather unremarkable but it has a more strongly raised subalar prominence than any other species in this group.

It is only known from tropical Queensland.

MATERIAL EXAMINED

Holotype ♀, **Queensland**: Baldy Mtn Road, via Atherton, vi.1981, ex Malaise trap (*Brown*) (QM).

Paratypes. **Queensland**: 1 ♂, 3 km N. by E. Mt Tip Tree (17°02'S 145°37'E), x.1980, at light (*Cardale*) (ANIC); 1 ♀, Windsor Tableland via Mt Carbine, xii.1980, ex Malaise trap (BMNH).

Certonotus sp. A

(Figs 48, 50)

Female. Medium-sized species, fore wing length 7 mm. Labium with glossae unspecialized. Lower face at narrowest point 1.3 times as broad as high; malar space 1.0 times as long as basal mandibular width. Occipital carina ventrally long, about 3 times length of abscissa of hypostomal carina between it and base of mandible. Upper part of pronotum, slightly before posterior corner, moderately convex, in dorsal view projecting beyond mesoscutal margin; subalar prominence weakly convex, rather sharp and ridge-like. Scutellum coarsely, closely punctate, transverse keel weak; metapleuron closely, coarsely punctate; submetapleural carina anteriorly expanded into a broad rounded flange, metanotum with a distinct tooth near anterior end of lateral carina. Propodeum moderately long with anterior transverse carina centrally strong; lateromedian longitudinal carina present anteriorly and weak between transverse carinae; pleural carina strong anteriorly, posteriorly obsolescent; area superomedia clearly discernible, hexagonal; area spiracularis complete; first and second lateral areae indistinctly delineated, confluent. Fore wing with 3*r-m* converging towards 2*r-m*, joining *Rs* separately; 2*m-cu* joining *M* opposite 3*r-m*. Hind wing with distal abscissa of *Cu*₁ absent. Hind tibia with posterior margin without spine-like bristles. Gaster with segment 1 short, the sternite 0.2 times as long as hind coxa, not reaching level of spiracle. Tergite 7 mediodorsally with indentation on posterior margin; tergite 8 posteriorly very elongate and narrow; tergite 9 in dorsal view quadrate, rounded posteriorly. Ovipositor projecting beyond apex of gaster by 4 times length of hind tibia.

Coloration. Head blackish with lower face, genal and frontal orbits yellow; alitrunk reddish brown, the tergites peripherally black and only tegula and subalar prominence yellow. Gaster with tergites 3+ with posterior and lateral margins very narrowly yellow. Legs reddish brown, anterior two pairs of coxae yellowish marked, hind coxa, trochanter, femur proximally and distally, and tarsus infusate. Pterostigma blackish, wings hyaline.

Male. Unknown.

REMARKS. *Certonotus* sp. A is easily recognized by its colour pattern and possession of very slender tergal processes. The area superomedia is almost regularly hexagonal and strongly delineated except for the weak posterolateral sides. Despite lacking any trace of a distal abscissa of *Cu*₁ in the hind wing this species appears to be quite closely related to *C. ixion*, suggesting it belongs in the *humeralifer*-group rather than in the *leeuwinensis*-group.

It is known only from Western Australia.

MATERIAL EXAMINED

Western Australia: 1 ♀, Swan River (BMNH).

Tribe POECILOCRYPTINI

This relatively small tribe is characterized by the lack of an occipital carina dorsally and the presence of a single bulla in vein 2*m-cu* in the fore wing. It is restricted to Australia where it is represented by three genera, *Alaothyris*, *Urancyla* and *Poecilocryptus*.

Very little is known about the biology of poecilocryptines, but the available records suggest the species all oviposit into nutritious plant tissue. It is possible that the larva is partially phytophagous, as it has rather massive mandibles (Short, 1978).

Key to genera of Poecilocryptini

- 1 Fore wing with areolet and *2r-m* obliterated by fusion of *Rs* and *M* (Fig. 63); gaster strongly laterally compressed; ovipositor very long, at least 6.0 times length of hind tibia **ALAOETHYRIS** Gauld (p. 138)
- Fore wing with areolet distinct, bounded internally by *2r-m* (Fig. 5); gaster cylindrical or depressed; ovipositor less than 5.0 times length of hind tibia 2
- 2 Hind wing with distal abscissa of *Cu*₁ present; propodeal carinae vestigial dorsally; ovipositor strongly decurved (Fig. 64) **URANCYLA** Gauld (p. 141)
- Hind wing with distal abscissa of *Cu*₁ absent; propodeum with at least some carinae dorsally; ovipositor more or less straight **POECILOCRYPTUS** Cameron (p. 139)

ALAOETHYRIS Gauld

Genus A; Gauld, 1983: 169.

Alaothyris Gauld, 1984: 93. Type-species: *Alaothyris elongissimus* Gauld, by original designation.

Medium-sized species, fore wing length 6 mm; clypeus small, flat, truncate; labrum moderately large, exposed; mandible quite short, tapered, twisted about 20 times, almost evenly bidentate; malar space slightly less than basal mandibular width. Occipital carina absent on dorsal part of head, ventrally joining hypostomal carina above base of mandible. Antenna long, not tapered. Mesoscutum polished, almost smooth; notaulus deep on anterior 0.2 of scutum, notaular crest occluding extreme anterior end; scutellum weakly convex, not laterally carinate; propodeum long, evenly rounded without carinae dorsally; propodeal spiracles circular; gaster inserted at end of short propodeal neck, above and far behind coxal insertion. Fore tibia with a small tooth on outer side; mid and hind coxae very elongate; tarsal claws simple. Fore wing with *cu-a* proximal to base of *Rs* & *M*; *3r-m* absent; *Rs* and *M* fused to obliterate areolet and *2r-m*; *2m-cu* with a single bulla. Hind wing with distal abscissa of *Cu*₁ absent; basal cell slender; *Sc* bearing one hamulus. Gaster very long and slender, laterally compressed; tergite 1 slender, with spiracles a little behind centre; sternite 1 reaching far behind level of spiracles; tergites 2–3 with laterotergites folded under. Ovipositor very long and slender, projecting beyond apex of gaster by more than 6.0 times length of hind tibia; apex cylindrical.

REMARKS. A very distinctive genus easily recognized by its slender facies and characteristic venation. The systematic position of this genus is questionable. The mandible and elongate structure suggest a relationship with the Labenini, but the position of the petiolar spiracle, venation and shape of propodeum suggest that it is perhaps more closely related to the Poecilocryptini, especially *Poecilocryptus*. Unlike the Labenini, *Alaothyris* does not have fine, file-like teeth on the ovipositor apex, nor apparently does it have a lobe at the base of the ovipositor sheath. A single species is known.

Alaothyris elongissimus Gauld

(Fig. 63)

Alaothyris elongissimus Gauld, 1984: 94. Holotype ♀, QUEENSLAND (ANIC) [examined].

Female. Lower face slightly elongate, with a pronounced central tubercle; eye surface finely pubescent; ocelli arranged in an equilateral triangle; flagellum with about 28 segments. Mesoscutum polished, impunctate; mesopleuron and metapleuron similarly smooth, epicnemial carina dorsally obsolescent; submetapleural carina broad anteriorly. Gaster highly polished.

Coloration. Predominantly orange-brown species with flagellum, hind leg and gaster darker brown. Pterostigma brown, wings hyaline.

Male. Similar to female.

REMARKS. The holotype and paratype emerged from the seeds of *Araucaria cunninghamii*. What their host was is not known. Probably it will be found to be some seed-feeding beetle, but the possibility (given the semi-phytophagous tendencies of some labenines) that this is partially a seed-feeding ichneumonid cannot be ruled out.

MATERIAL EXAMINED

Holotype ♀, **Queensland:** Yarraman, vii.1969 (*Heather*) (ANIC).

1 ♂ (paratype), same data as holotype.

POECILOCRYPTUS Cameron

Poecilocryptus Cameron, 1901: 527. Type-species: *Poecilocryptus nigromaculatus* Cameron, by monotypy.

Poecilopimpla Morley, 1914: 35, 36. [Unnecessary replacement name for *Poecilocryptus* Cameron.] [Homonym of *Poecilopimpla* Cameron, 1903.]

Medium-sized species, fore wing length 6–10 mm; clypeus rather small, apically very thin, truncate; labrum small, exposed; mandible short, slightly twisted, strongly narrowed, bidentate; malar space shorter than basal mandibular width. Occipital carina dorsally absent; eye with a weak indentation opposite antennal socket. Antenna moderately long, clavate. Mesoscutum polished, virtually impunctate; notauli deep on anterior 0.2 of scutum, notaular crests strong. Propodeum abruptly rounded with spiracle oval; area superomedia large, quadrate, often confluent with area petiolaris; area externa not usually defined laterally; gaster inserted well above level of hind coxae. Fore tibia simple, its apex not bearing a long spine; tarsal claws large, simple, or in some species those of the anterior two pairs of legs basally lobate. Fore wing with *cu-a* slightly proximal to base of *Rs&M*; *3r-m* complete, enclosing a large, transverse pentagonal areolet; *2m-cu* with a single bulla, straight but inclivous. Hind wing with distal abscissa of *Cu₁* absent; basal cell not exceptionally broad; *Sc* bearing about two hamuli. Gaster long, quite slender; tergite 1 slender, evenly broadened posteriorly with spiracles at or slightly behind centre, sternite reaching to spiracles, that of female bearing a pair of knob-like protuberances near anterior end. Ovipositor moderately long, projecting beyond apex of gaster by 2.8–3.3 times length of hind tibia, its apex cylindrical, with lower valve partially enclosing the upper, with an indistinct matt area laterally, the upper valve with weak dorsal teeth.

REMARKS. *Poecilocryptus* is an endemic Australian genus with species widely distributed throughout the continent. They seem to be associated with a variety of galls on trees of the genera *Eucalyptus* and *Acacia*. Parrott (1954) recorded three species from Australia. In this work four species are recognized, two of which are described as new. One, *P. galliphagus*, has previously been incorrectly known as *P. nigromaculatus*. In fact *nigromaculatus* is a senior synonym of *P. stramineus*.

The relationships of the species. The four species may be placed in two species-groups, the *nigromaculatus*-group (containing *nigromaculatus* and *galliphagus*) which is characterized by having acute lobes on the claws of the anterior two pairs of legs, and the *nigripectus*-group (containing *nigripectus* and *coloratus*) which has the first lateral area very reduced in size.

Key to species of *Poecilocryptus*

- 1 Tergites 1 and 2 of gaster white; alitrunk predominantly black, only pronotum and anterior parts of mesoscutum and mesopleuron orange ***coloratus*** sp. n. (p. 139)
- Tergites 1 and 2 of gaster bright yellow, sometimes with black marks; alitrunk predominantly bright yellow with profuse black spots 2
- 2 Propodeum with area superomedia delineated posteriorly by a strong carina (Fig. 56); flagellum with a subapical pale mark; sternite 1 of gaster with weak antero-ventral sublateral keels; tergite 2 entirely yellow ***nigripectus*** Turner & Waterston (p. 140)
- Propodeum with area superomedia not delineated posteriorly (Fig. 57); flagellum entirely black; sternite 1 of gaster with strong antero-ventral sublateral tubercles; tergite 2 always black-marked 3
- 3 Distal apex of hind femur black; ovipositor projecting beyond apex of gaster by 2.0–2.3 times length of hind tibia ***galliphagus*** sp. n. (p. 140)
- Distal apex of hind femur yellow; ovipositor projecting beyond apex of gaster by 2.8–3.3 times length of hind tibia ***nigromaculatus*** Cameron (p. 141)

***Poecilocryptus coloratus* sp. n.**

Female. Unknown.

Male. Small species, fore wing length 4–5 mm. Hypostomal carina, above mandibular base, weakly raised. Metapleuron smooth and highly polished. Propodeal carinae quite weak; area superomedia not delineated by a carina posteriorly; lateral longitudinal carina present above spiracle; first lateral area quite small, less than the area of area dentipara. Fore wing with *Rs* between *2r-m* and *3r-m* distinctly shorter than length of *2r-m*. Fore and mid tarsal claws simple. Gaster with sternite 1 simple.

Coloration. Face whitish, head, pronotum and anterior parts of mesothorax orange. Remainder of alitrunk black. Gaster with tergites 1 and 2 white, 3 white with a central black mark, 4+ black with posterior and lateral margins broadly white. Flagellum black. Fore leg orange; mid leg with femur and

proximal segments white, tibia and tarsus blackish; hind leg black, femur proximally and distally slightly reddish orange. Pterostigma blackish, wings infumate.

REMARKS. This small species is easily recognized by its atypical colour pattern. It is the only species in the genus that is not predominantly yellow. The propodeal carination is also quite distinctive. The simple tarsal claws and small first lateral area suggest *P. coloratus* may be related to *P. nigripectus*.

MATERIAL EXAMINED

Holotype ♂, **Tasmania**: Coles Bay, ii-iii.19-- (TC).

Paratypes. **Tasmania**: 3 ♂, same data as holotype (BMNH, TC); 1 ♂, Mt Barrow, 700 m, ii.19-- (TC).

Poecilocryptus galliphagus sp. n.

[*Poecilocryptus nigromaculatus* Cameron; Parrott, 1954: 240. Misidentification.]

Female. Medium-sized species, fore wing length 7–10 mm. Hypostomal carina, above mandibular base, moderately raised. Metapleuron smooth and highly polished. Propodeal carinae strong; area superomedia not delineated by a carina posteriorly; lateral longitudinal carina not complete above spiracle; first lateral area very large, more than twice the area of area dentipara. Fore wing with *Rs* between *2r-m* and *3r-m* about twice as long as length of *2r-m*. Fore and mid tarsal claws with a well-developed acute basal lobe. Gaster with sternite 1 bearing a pair of antero-ventral sublateral tubercles. Ovipositor projecting beyond apex of gaster by 2.0–2.3 times length of hind tibia.

Coloration. A bright yellow species with black marks on interocellar area, vertex behind ocelli, three longitudinal stripes on mesoscutum, anterior propodeal areae, anterior margin of all abdominal tergites, hind femur centrally and hind tibia distally. Flagellum and ovipositor sheath black. Distal tarsal segments slightly infusate. Pterostigma dark brown, wings hyaline.

Male. Similar to female though slightly more slender, often with sternal tubercles very weak.

REMARKS. This species is rather similar to *P. nigromaculatus*, with which it is frequently confused in collections. The two species may easily be separated by the characters given in the key.

HOST RECORDS. This species has been reared from galls on *Eucalyptus delegatensis* and *E. pauciflora*.

MATERIAL EXAMINED

Holotype ♀, **Victoria**: Wiseleigh via Bruthen, ix.1962, ex eucalypt gall (*Hobb*) (NMV).

Paratypes. **Queensland**: 1 ♀, no further data (*Riek*) (BMNH). **New South Wales**: 1 ♀, Dainer's Gap, xi.1972 (ANIC); 1 ♀, Deer Vale, i.1931 (*Burns*) (NMV); 1 ♂, Mt Victoria, x.1930 (*Burns*) (NMV); 1 ♀, Sydney (*Froggatt*) (ANIC). **Victoria**: 2 ♀, Eildon area, ix.1959 (*Irvine*) (NMV); 2 ♀, Mt Pinniber, iv.1961 (*Taylor*) (ANIC); 1 ♀, Toolangi, xi.1982 (*Farrugia*) (BMNH); 3 ♀, Warrandyte, viii-x.1928 (*Hill*) (ANIC); 2 ♂, no further locality data (*French*) (BMNH). **Tasmania**: 3 ♀, Collinsvale, Fairy Glen, i-ii.1983 (*Williams & Gauld*) (BMNH).

Poecilocryptus nigripectus Turner & Waterston

(Fig. 56)

Poecilocryptus nigripectus Turner & Waterston, 1920: 24. Holotype ♀, TASMANIA (BMNH) [examined].

Female. Medium-sized species, fore wing length 7–11 mm. Hypostomal carina, above mandibular base, strongly raised. Metapleuron with distinct longitudinal wrinkles, moderately polished. Propodeal carinae strong; area superomedia rectangular, delineated by a carina posteriorly; lateral longitudinal carina complete above spiracle; first lateral area not exceptionally large, of approximately the same area as area dentipara. Fore wing with *Rs* between *2r-m* and *3r-m* subequal to length of *2r-m*. Fore and mid tarsal claws simple. Gaster with sternite 1 bearing a pair of weak antero-ventral sublateral keels. Ovipositor projecting beyond apex of gaster by 2.2–2.4 times length of hind tibia.

Coloration. Bright yellow species with interocellar area, vertex behind eyes, posterior part of mesoscutum, anterior part of propodeum and metapleuron, anterior 0.7 of tergite 1, and most of tergites 3 and 6 black. Legs yellow, hind femur broadly black centrally, distal hind tarsal segment infusate. Flagellum black, with a broad subapical yellowish white band. Pterostigma dark brown, wings hyaline.

Male. Similar to female but slightly more slender and with gastral tergites more coarsely punctate.

REMARKS. This is a particularly characteristically patterned species. Structurally it is more similar to *P. coloratus* than it is to *P. nigromaculatus*, a species that it superficially resembles in ground-colour.

HOST RECORDS. In the BMNH is a specimen reared from anthribid galls.

MATERIAL EXAMINED

Holotype ♀, **Tasmania**: Mt Wellington (Turner) (BMNH).

Queensland: 4 ♀, Brisbane, ii.1969 (*Campbell*) (QM); 1 ♂, Iron Range, v.1975 (*Moulds*) (AM); 1 ♀, no data (NMV). **New South Wales**: 1 ♂, Bateman's Bay, x.1969 (*Riek*) (ANIC); 1 ♀ Bendigo (*Froggatt*) (ANIC). **Australian Capital Territory**: 2 ♀, Canberra, x.1930 (*Bruce*) (ANIC).

Poecilocryptus nigromaculatus Cameron

Poecilocryptus nigromaculatus Cameron, 1901: 528. LECTOTYPE ♀, AUSTRALIA (BMNH), here designated [examined].

Poecilocryptus (sic) *nigro-maculatus* Cameron; Cameron, 1911: 335.

Poecilopimpla nigromaculata (Cameron) Morley, 1914: 36.

Poecilopimpla nigromaculata var. *straminea* Morley, 1914: 36. Holotype ♀, NEW SOUTH WALES (BMNH) [examined]. **Syn. n.**

Poecilocryptus stramineus (Morley) Parrott, 1954: 241.

Poecilocryptus nigromaculatus Cameron; Townes *et al.*, 1961: 117.

Female. Medium-sized species, fore wing length 6–10 mm. Hypostomal carina, above mandibular base, weakly raised. Metapleuron smooth and highly polished. Propodeal carinae strong; area superomedia not delineated by a carina posteriorly; lateral longitudinal carina absent above spiracle; first lateral area very large, more than twice the area of area dentipara. Fore wing with *Rs* between *2r-m* and *3r-m* about twice as long as length of *2r-m*. Fore and mid tarsal claws with a well-developed acute basal lobe. Gaster with sternite 1 bearing a pair of antero-ventral sublateral tubercles. Ovipositor projecting beyond apex of gaster by 2.8–3.3 times length of hind tibia.

Coloration. A bright yellow species with black marks on interocellar area, vertex behind ocelli, three longitudinal stripes on mesoscutum, anterior propodeal areae, anterior margin of all abdominal tergites and hind femur centrally. Flagellum and ovipositor sheath black. Distal hind tarsal segments strongly infusate. Pterostigma dark brown, wings hyaline.

Male. Similar to female though slightly more slender, often with sternal tubercles very weak.

REMARKS. In the BMNH are two specimens labelled as 'Cameron types' of *nigromaculatus*. They are conspecific and one has been labelled and is here designated as lectotype. Morley (1914) clearly referred to the female that was reared by Froggatt as the 'typical' specimen, and this must be construed as a valid type restriction (Art. 73(a)(i) of the *Code*). Parrott (1954) was incorrect to refer to the male in Froggatt's collection as the holotype. The female holotype is a slightly undersized specimen, but clearly conspecific with *nigromaculatus*.

P. nigromaculatus appears to be the sister-species of *P. galliphagus*. Both species have a well-developed basal lobe on the fore and mid tarsal claws and have the first lateral area of the propodeum greatly enlarged. *P. nigromaculatus* may be recognized by its elongate ovipositor and entirely yellow hind tibia. We have examined the differences between this species and *galliphagus* tabulated by Parrott (1954) and have found that only the ovipositor character holds up. We failed to find any difference in the ratio of interocellar to orbital-ocellar distance, and the range of numbers of flagellar segments for both species is very similar. Small specimens of either species have fewer flagellar segments than large individuals. The extent of the black banding on third to fifth gastral tergites is quite variable in both species.

HOST RECORDS. *P. nigromaculatus* has been reared from anthribid and chalcid galls on *Acacia longifolia*, and eriococcid galls on *Eucalyptus*.

MATERIAL EXAMINED

Lectotype ♀ (*nigromaculatus* Cameron), '**Australia**': no further data (BMNH). Paralectotype, 1 ♀, same data (BMNH). Holotype ♀ (*nigromaculata* var. *straminea* Morley), **New South Wales**: no further data (*Froggatt*) (BMNH).

'**Australia**': 1 ♀ (paralectotype of *nigromaculatus*) (BMNH). 38 ♀, 34 ♂, **Queensland**, **New South Wales**, **Australian Capital Territory**, **Victoria**, **Tasmania** (ANIC, BMNH, NMV).

URANCYLA Gauld

Genus U; Gauld, 1983: 169.

Urancyla Gauld, 1984: 95. Type-species: *Urancyla fulva* Gauld, by original designation.

Medium-sized species; fore wing length 6 mm; clypeus flat, small, apically truncate with margin thin;

mandible strongly tapered, twisted and with upper tooth slightly the longer; malar space shorter than basal mandibular width. Occipital carina absent dorsally, ventrally joining hypostomal carina well above base of mandible. Antenna long, neither tapered nor clavate distally. Mesoscutum polished, punctate; notaulus present near front margin, with a small crest occluding extreme end; scutellum flat, without lateral carinae; propodeum evenly rounded with vestiges of carinae though areae superomedia and petiolaris are not defined; gaster inserted low on propodeum, near level of hind coxae. Fore tibia with a small tooth on outer side, femur with a weak longitudinal ventral furrow; tarsal claws of female with a basal lobe. Fore wing with *cu-a* subopposite *Rs&M*; *3r-m* present, weakly pigmented, enclosing a small pentagonal areolet; *2m-cu* with a single bulla. Hind wing with distal abscissa of *Cu₁* present; first abscissa of *Cu₁* shorter than *cu-a*; basal cell moderately broad; *Sc* bearing one hamulus. Gaster moderately long, tergite 1 slender with spiracle slightly behind centre; tergites 2 and 3 with pendant laterotergites which are almost membranous. Ovipositor about as long as gaster, evenly decurved, apex simply acute with inconspicuous teeth and indistinct matt area laterally.

Male. Unknown.

REMARKS. In Townes' (1969) key to Labiinae this genus runs to the tribe Clasini but it does not appear to be related to the genera in this group. Clasines have a nodus on the ovipositor apex, long, simple claws and two bullae in *2m-cu*. They also have no trace of a notaular crest. The twisted mandible and single bulla in *2m-cu* are characters that *Urancyla* shares with *Poecilocryptus* and the two genera appear to be closely related.

Urancyla fulva Gauld

(Fig. 64)

Urancyla fulva Gauld, 1984: 95. Holotype ♀, QUEENSLAND (TC) [examined].

Female. Lower face elongate, regularly punctate; frons polished and finely punctate; ocelli arranged in an equilateral triangle. Flagellum with 30 segments. Mesoscutum polished, regularly and finely punctate; mesopleuron highly polished, smooth, almost impunctate; metapleuron polished with scattered fine punctures; submetapleural carina moderately wide, evenly tapered anteriorly. Gaster highly polished, finely punctate.

Coloration. Predominantly orange-brown species; face, upper orbits, genae, propleuron, anterior margin of pronotum, diagonal stripe across mesopleuron, fore coxa and trochanters and a stripe on mid coxa pale yellowish; flagellum, except centrally, scape and pedicel, frons centrally, vertex, interocellar area, occiput, mesoscutum and ovipositor sheath, pterostigma black.

Male. Unknown.

REMARKS. This species is known only from the holotype.

MATERIAL EXAMINED

Holotype ♀, Queensland: Brisbane, xi.1972 (*Sedlacek*) (TC).

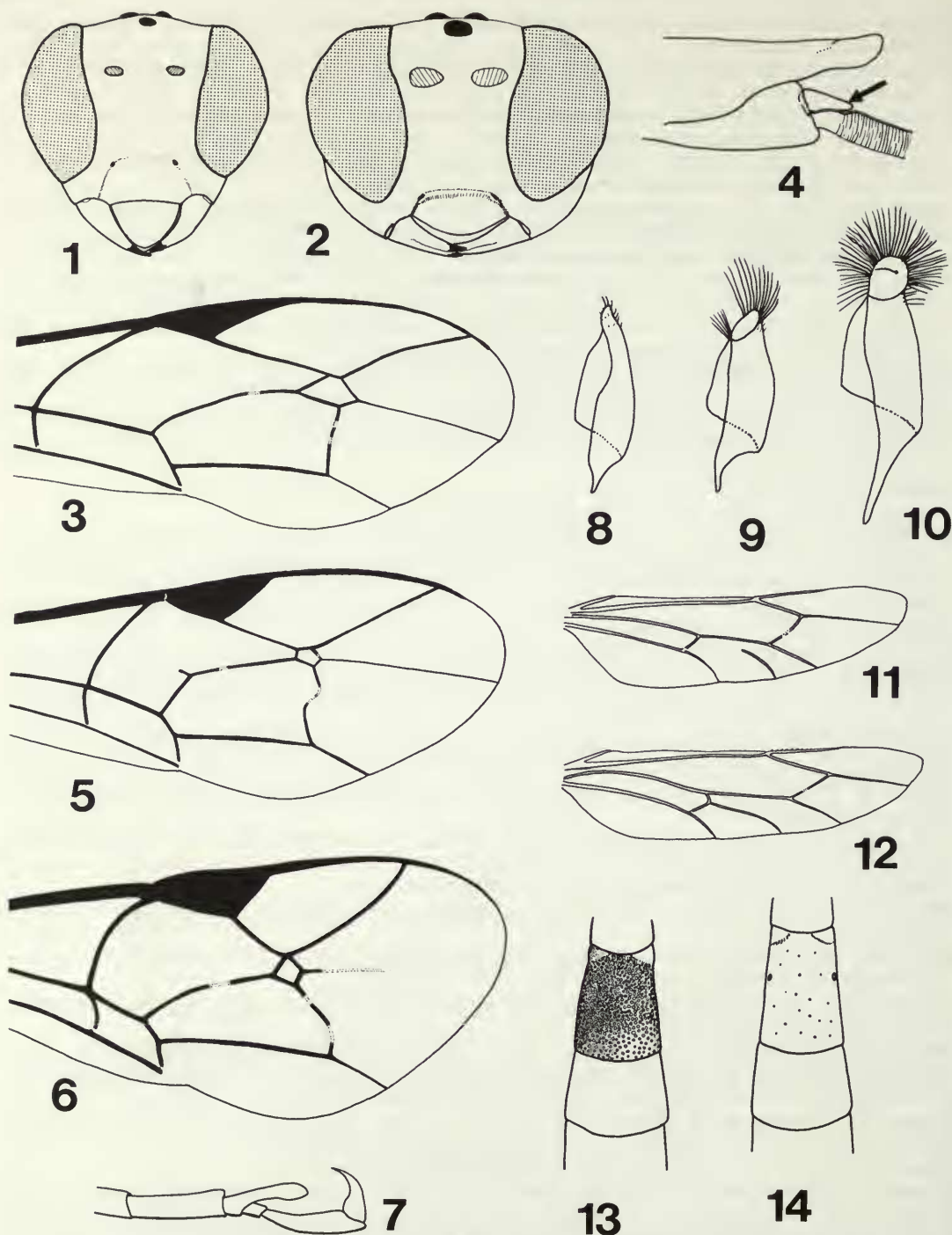
Acknowledgements

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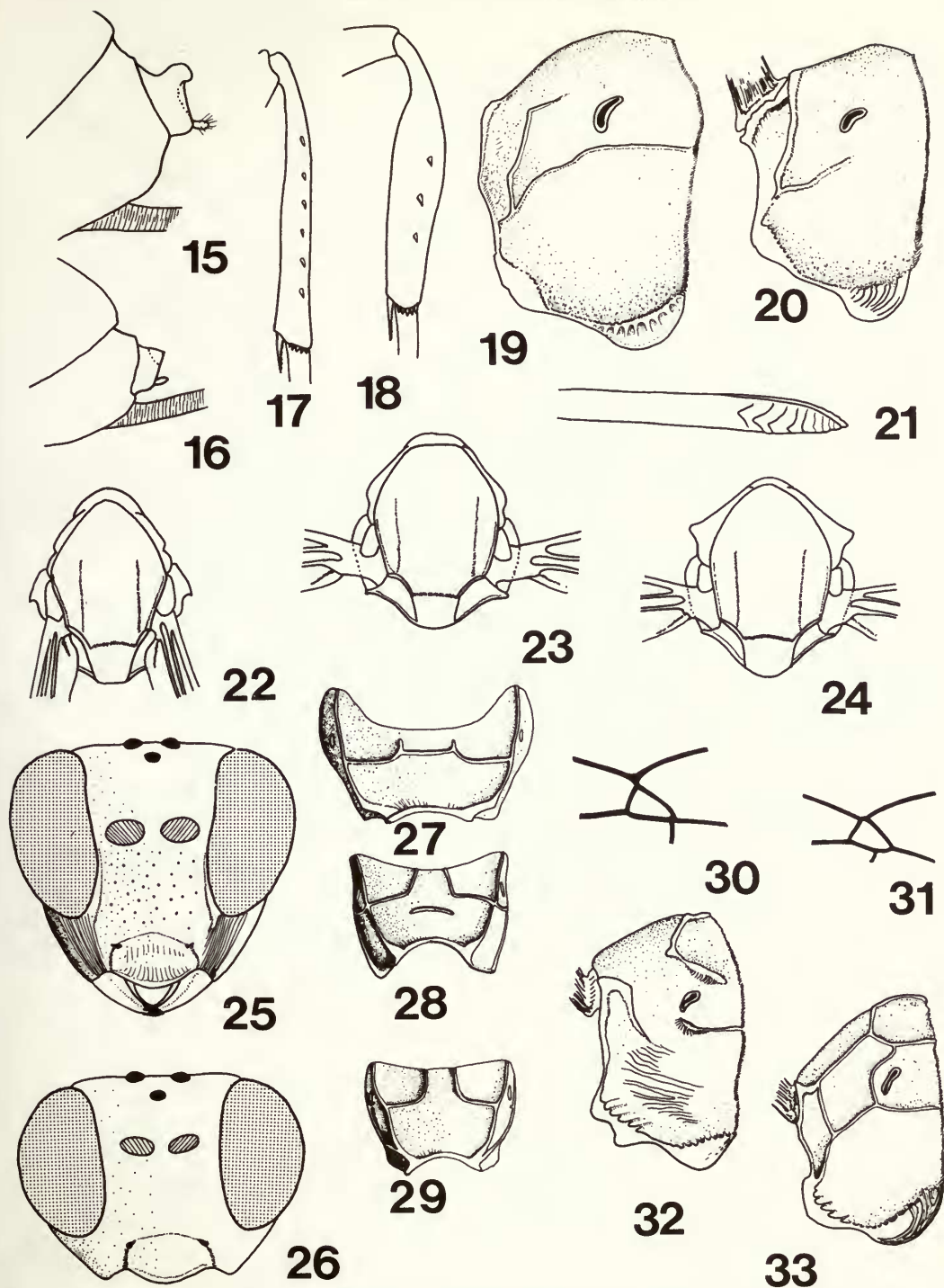
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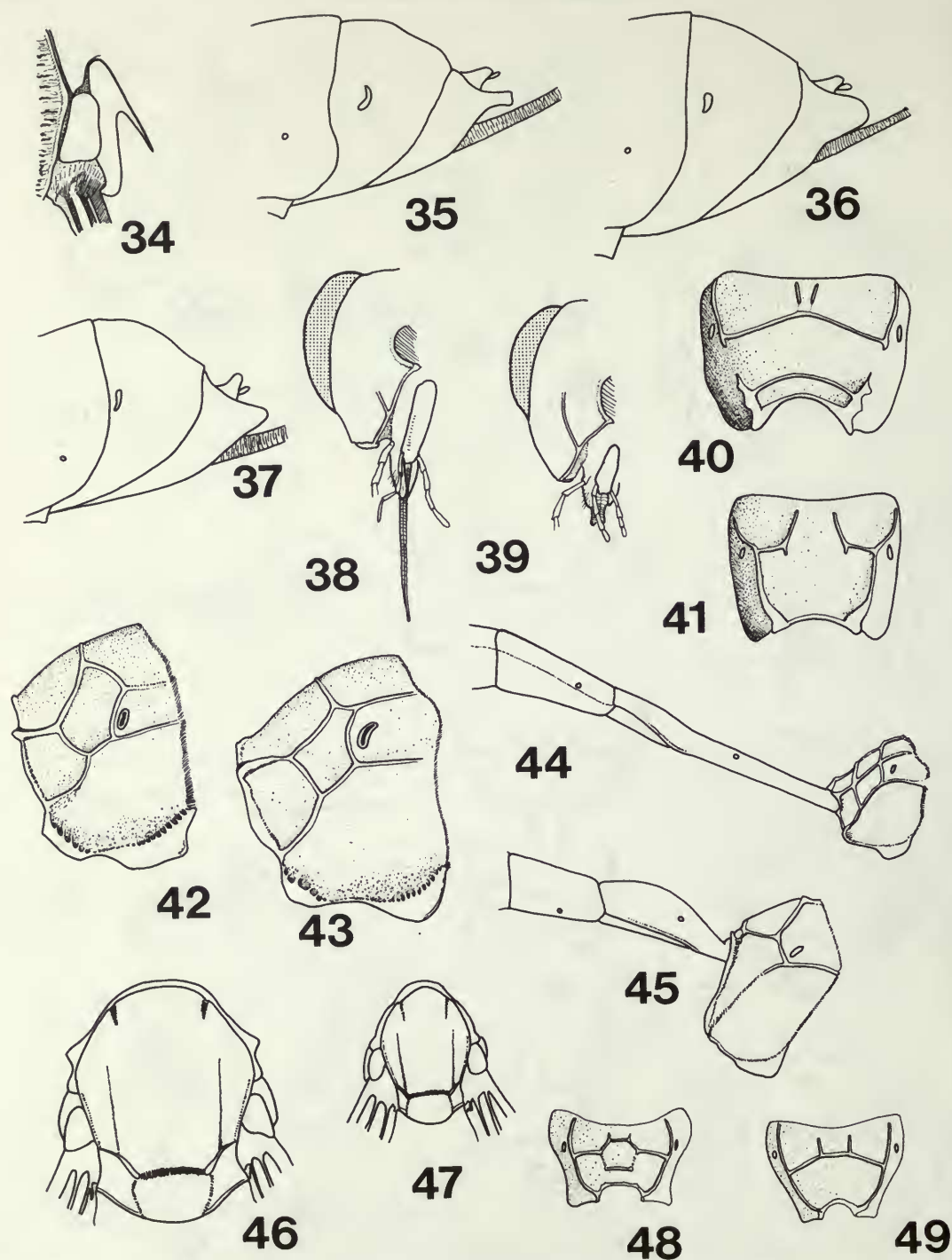
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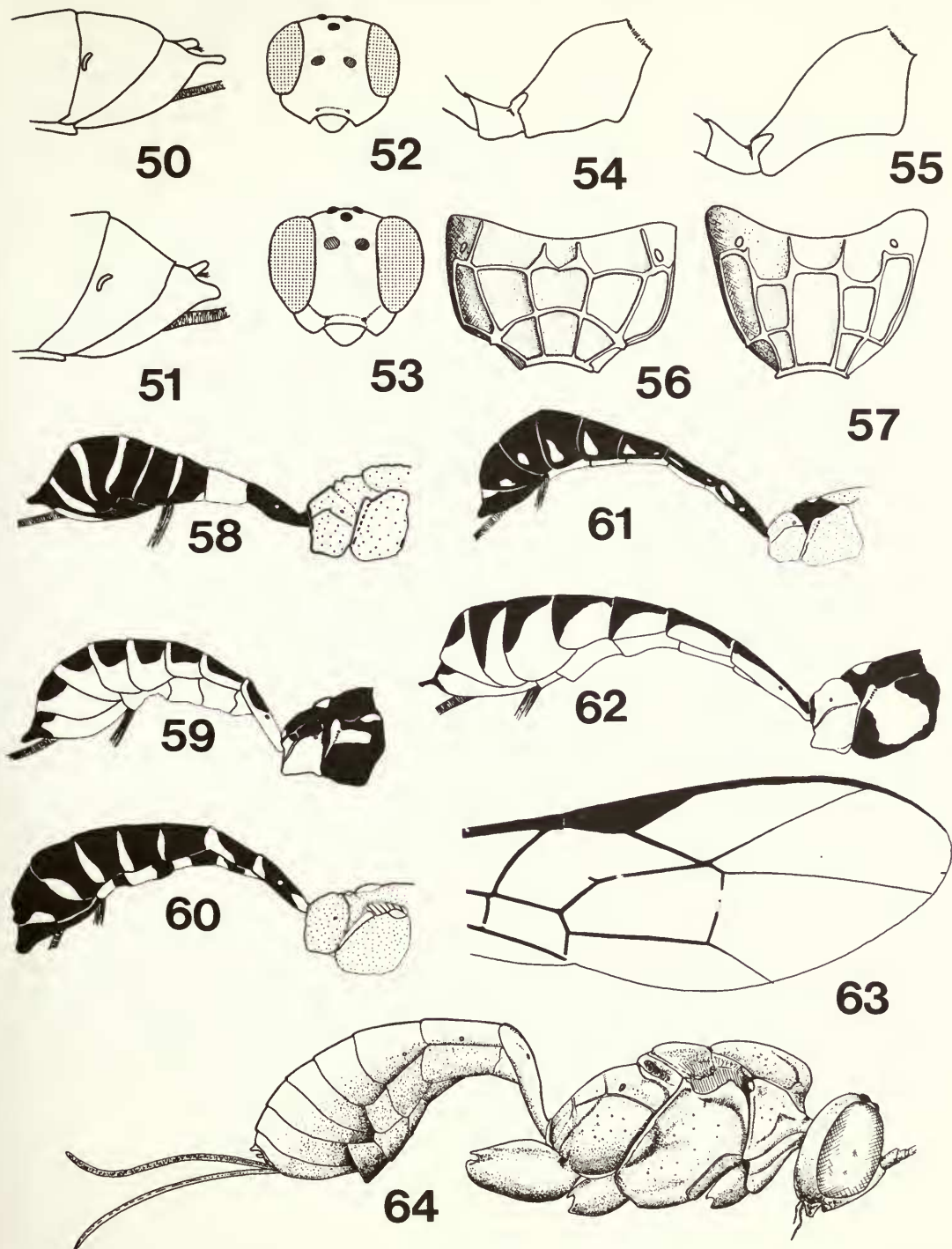
Figs 1-14 1, 2, face of (1) *Labium* sp.; (2) *Labena* sp. 3, fore wing of *Labena* sp. 4, base of ovipositor sheath, *Certonotus nitidulus*. 5, 6, fore wings of (5) *Urancyla fulva*; (6) *Adelphion* sp. 7, fore leg of *Labena* sp. 8-10, gonosquama of (8) *Labena annulata*; (9) *L. keira*; (10) *L. pudenda*. 11, 12, hind wings of (11) *L. annulata*; (12) *L. keira*. 13, 14, tergite 2 of (13) *L. annulata*; (14) *L. chadwickii*.



Figs 15–33 15, 16, end of gaster of (15) *Labena grandis*; (16) *L. malecasta*. 17, 18, mid tibia of (17) *L. jacunda*; (18) *L. keira*. 19, 20, propodeum of (19) *L. keira*; (20) *L. pudenda*. 21, apex of ovipositor, *L. pudenda*. 22–24, pro- and mesoscutum of (22) *Certonotus rufescens*; (23) *C. apicalis*; (24) *C. humeralifer*. 25, 26, face of (25) *C. rufescens*; (26) *C. humeralifer*. 27–29, propodeum of (27) *C. humeralifer*; (28) *C. annulatus*; (29) *C. andrewi*. 30, 31, areolet of fore wing of (30) *C. humeralifer*; (31) *C. annulatus*. 32, 33, propodeum of (32) *C. geniculatus*; (33) *C. nitidulus*.



Figs 34–49 34, subalar prominence of *Certonotus talus*. 35–37, end of gaster of (35) *C. talus*; (36) *C. sisypheus*; (37) *C. cestus*. 38, 39, mouthparts and back of head of (38) *C. monticola*; (39) *C. sisypheus*. 40, 41, dorsal view of propodeum of (40) *C. sisypheus*; (41) *C. avitus*. 42, 43, lateral view of propodeum of (42) *C. avitus*; (43) *C. cestus*. 44, 45, propodeum and tergite 1 of (44) *C. celeus*; (45) *C. pineus*. 46, 47, alitrunk of (46) *C. pineus*; (47) *C. mogimbensis*. 48, 49, propodeum of (48) *Certonotus* sp. A; (49) *C. leeuwinensis*.



Figs 50–64 50, 51, end of gaster of (50) *Certonotus* sp. A; (51) *C. zebrus*. 52, 53, head of (52) *C. leeuwinensis*; (53) *C. zebrus*. 54, 55, hind coxa of (54) *C. paluma*; (55) *C. ixion*. 56, 57, propodeum of (56) *Poecilocryptus nigripectus*; (57) *P. nigromaculatus*. 58–62, body in profile to show colour pattern of (58) *Certonotus farrugiai*; (59) *C. zebrus*; (60) *C. toolangi*; (61) *C. ixion*; (62) *C. paluma*. 63, fore wing of *Alaothyris elongissimus*. 64, alitrunk and gaster of *Urancyla fulva*.

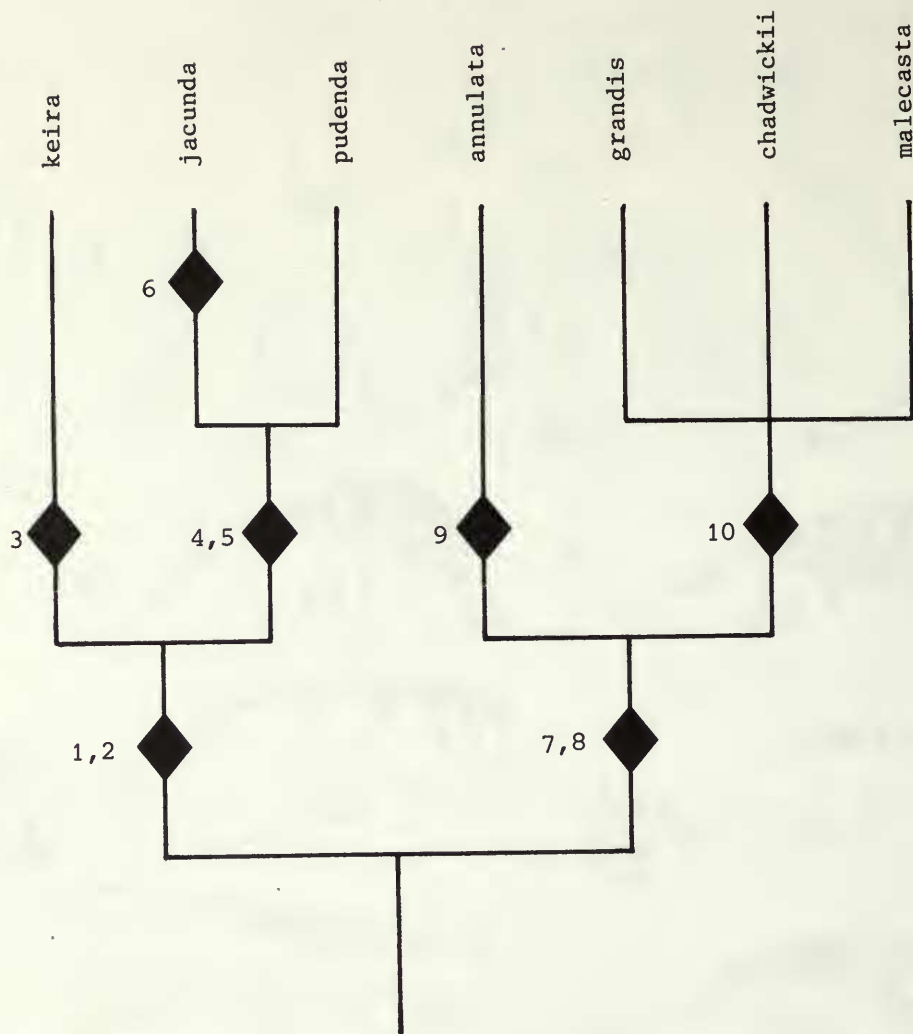


Fig. 65 Cladogram showing putative phylogenetic relationship of Australian species of *Labena*. (Note. The holophyly of this grouping *vis à vis* the Neotropical species has not been established.) The apomorphic features supporting this cladogram are: 1, mesopleuron smooth; 2, ring of long hairs around apex of gonosquama; 3, apex of fore wing infumate; 4, apex of gonosquama indented; 5, apex of ovipositor with coarse teeth; 6, fore tibia slender; 7, vein Cu_1 incomplete in hind wing; 8, flagellum with apical white band; 9, gaster closely punctate; 10, mesoscutum striate.

Index to hosts

Host plants, as well as host insects, are included in this index.

- | | | |
|------------------------------|------------------------------------|---------------------------------|
| <i>Acacia longifolia</i> 141 | <i>Ethon affine</i> 114 | <i>Sirex noctilio</i> 131 |
| Buprestidae 114, 124 | <i>Eucalyptus</i> 141 | <i>Sirex</i> sp. 114, 132 |
| Cerambycidae 113 | <i>Eucalyptus delegatensis</i> 140 | Siricidae 131 |
| <i>Diadoxus</i> sp. 124 | <i>Eucalyptus pauciflora</i> 140 | <i>Uracanthus strigosus</i> 113 |
| | <i>Pinus radiata</i> 114 | |

Index to Ichneumonidae

Invalid names are in *italics*; principal references are in **bold**.

- | | | |
|----------------------------------|-------------------------------------|--|
| Alaothyris 109, 138 | hinnuleus 108, 120, 126 | nitidulus 108, 119, 131 |
| andrewi 108, 119, 121 | humeralifer 108, 119, 127 | paluma 108, 121, 132 |
| annulata 109, 112, 113 | | pineus 108, 120, 132 |
| apicalis 108, 119, 122 | ixion 108, 121, 128 | Poecilocryptini 108, 109, 137 , 138 |
| <i>Asperellus</i> 108, 117 | | Poecilocryptus 109, 138, 139 |
| avitus 108, 120, 123 | jacunda 109, 112, 115 | pudenda 109, 113, 117 |
| | | rufescens 108, 119, 133 |
| celeus 108, 120, 123 | keira 109, 112, 115 | |
| Certonotus 108, 111, 117 | Labena 109, 111 , 112 | sisyphus 108, 120, 134 |
| cestus 108, 120, 123 | Labeninae 108, 109 , 110 | species A 109, 120, 137 |
| chadwickii 109, 112, 113 | Labenini 108, 109, 110 , 111 | <i>straminea</i> 109, 141 |
| coloratus 109, 139 | leeuwinensis 108, 120, 128 | |
| | | talus 108, 119, 121, 135 |
| elongissimus 109, 138 | malecasta 109, 112, 116 | <i>tasmanienis</i> 108, 131 |
| farrugiai 108, 120, 126 | mogimbensis 108, 120, 129 | toolangi 109, 121, 136 |
| fulva 109, 142 | monticola 108, 119, 130 | |
| | | Uraneyla 109, 138, 141 |
| galliphagus 109, 139, 140 | nigripectus 109, 139, 140 | zebrus 109, 120, 136 |
| geniculatus 108, 119, 124 | nigromaculatus 109, 139, 141 | |
| grandis 109, 112, 114 | | |